DGIN5201 – Digital Transformation
Course Syllabus

Instructor Information

Instructor:	Drs. Vlado Keselj and FE Bordeleau
E-mail:	vlado@cs.dal.ca and fe.bordeleau@dal.ca
Lectures:	Tue and Thu 13:05-14:25 LSC-Common Area C236
Labs:	B01: Fri 11:35-12:25 Goldberg Computer Science 134 B02: Fri 13:05-13:55 Goldberg Computer Science 143
Course Homepage:	https://tr.cs.dal.ca/dgin5201 https://dal.brightspace.com/d2l/home/360488
Teaching Assistant(s):	*TBA*
Course Mail List:	dgin5201@lists.dnlp.ca

Important Dates

- Mon Jan 6, 2025: Term starts, Lectures begin
- Mon Jan 20, 2025: Last day to add and drop classes
- Mon Feb 3, 2025: Last day to drop classes without a "W"
- Fri Feb 7, 2025: Munro day, University closed
- Mon Feb 17, 2025: Nova Scotia Heritage Day, University closed
- Mon-Fri Feb 17-21, 2025: Winter study break (no classes)
- Wed Mar 5, 2025: Last day to drop classes with a "W"
- Mon Apr 7, 2025: Friday schedule, Lectured end
- Apr 9-26, 2026: Exam period

Course Description

Digital technologies are critical to new product development and business transformation. Digital Innovation refers to "the carrying out of new combinations of digital technologies and physical components to produce novel products, processes, and service" (Yoo et al., 2010). The concept of digital innovation entails not only 'Digitization' of physical products or traditional services but it also requires firms to revisit their use of corporate digital resources, such as IT (Information Technology) assets and capabilities. This core digital innovation course focuses on the design and management of digital innovation projects for both public sector and private sector organizations. Specifically, this course provides students with knowledge and skills to initiate and execute digital innovation and transformation projects in existing organizations or new start-ups.

Learning Outcomes

- Be familiarized with prominent recent cases of digital disruption.
- Identify methods of business model disruption.
- Model and transform business processes.
- Distinguish advantages and disadvantages to qualitative and quantitative approaches to user feedback.

- Investigate and analyze disruptive innovation opportunities using the Osterwalder Value Proposition and Business Model canvases.
- Identify web front-end technologies and related frameworks.
- Develop basic front-end interfaces using web technologies.
- Identify back-end technologies and related frameworks.
- Develop basic back-end technologies.
- Apply common system design patterns to create basic usable software.
- Demonstrate familiarity with key emerging technologies and their implications.
- Discuss emerging topics with industry experts to identify opportunities for disruption.
- Identify resources for continuous improvement in the digital professions.
- Implement a complex digital transformation prototype.
- Reflect and disseminate methods for continued development of a digital transformation.

Course Rationale

This is a capstone course that teaches critical skills in digital innovation: the abilities to design, prototype and implement a digital transformation project.

Class Format and Course Communication

- Content will be delivered via a combination of lectures, seminars, individual exercises and interactive group exercises.
- The lectures are in-person, but if possible, they may be available via MS Teams and recorded.
- Course announcements will be posted to the course mail list, which comprises the instructor's and students' Dal emails, as well as Brightspace. It is the student's responsibility to check their Dal e-mail on a daily basis.

Evaluation Criteria

- Assignments (30%)
    - Two assignments, each worth 15%.
    - Late assignments will be penalized at 5% of the assignment grade per day, up to one week.
    - Assignment are due at 11:59 pm on the given dates:
    - Assignment 1 – Technical skills and tools for digital transformation
    - Assignment 2 – User feedback for digital transformation projects
    - Assignments must be submitted electronically.
    - These are individual submissions.
- Seminar Reports (20%)
    - You must submit all four brief reports, each worth 5% of your grade.
    - Blockchain
    - Robotic Process Automation
    - AI & Deep Learning
    - Process mining
- Final Project (50%)
    - The project will consist of deliverables made during key milestones.
    - Project specification
    - Early prototype
    - Project demo
    - Final report and code submission
    - Team and peer evaluation

Notes

- A minimum grade of B- is required in this course, as per FGS regulations

Student Declaration of Absence

The Student Declaration of Absence policy shall apply. https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html The student has a maximum of two (2) SDAs per course per semester. The student **must** notify the instructor of their inability to meet a deadline **before** the deadline by contacting the instructor or submitting the completed SDA. Upon notification the student has 3 days after the deadline to submit the SDA.

Midterm and Final Exam Requirements

- This course has no midterm or final exams.

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.

Required Texts and Resources

All learning materials are either accessible through the Dalhousie Library or Internet and will be provided on Brightspace.

Prerequisites

Second-semester status in the MDI program or permission from the instructors.

Tentative List of Topics

- Overview of The Business Perspective [Class 1]
  - Why digital transformation?
  - Course outcomes and objectives.
  - Technology adoption and disruption.
- Overview of The Technical Perspective [Class 1]
  - Why digital transformation?
  - Course outcomes and objectives.
  - Software basics and the importance of servers
- Rapid Prototyping [Classes 2 - 6]
  - Front-end design – Recap
  - Scripting language
  - Databases and architecture
  - Testing
  - Design patterns
  - Error resolution & problem solving
- Disruptive Innovation and Business Strategy [Classes 7 - 12]
  - Digital technologies as business disruptors
  - Digital strategies and organizational change
  - Business model innovation
  - The value proposition design
  - Business process modelling
  - How to collect user feedback
- Emerging technologies and prototyping [Classes 12 – 22]
  - Blockchain
  - Robotic Process Automation
  - AI and Deep Learning
  - Process Mining
  - Consistent small group feedback from teaching team
  - We will also hold class time to coach teams on the projects and project progress.
  - Guest lectures may be solicited at this time.

- Final Presentations [Classes 22 – 24]

Responsible Computing Policy

Usage of all computing resources in the Faculty of Computer Science must be within the Dalhousie Acceptable Use Policies (https://www.dal.ca/dept/university_secretariat/policies/information-management-and-technology/acceptable-use-policy-.html) 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

Use of Artificial Intelligence Tools

You may use AI-driven tools to assist you in learning but remember that your objective is to understand, achieve, and apply the course competencies and outcomes. While you may use tools for learning, specific assessments in this course will disallow the use of AI-driven tools to assert that you have attained course learning outcomes. This is because a graduate must be able to analyze, assess and produce work unassisted by AI technology. Where tools are allowed: you must acknowledge all tools used to assist you. If applicable, you must provide links to chat logs. Using AI-driven tools where prohibited constitutes an academic offense.

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[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:

[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: 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.

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=117&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

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://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/Code%20of%20Student%20Conduct%20rev%20Sept%202021.pdf)

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://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf)

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