



Innovation and Creativity (I+C)

ENG 1500

Winter 2022 (WL Term)

Course Designer: Dr. Andrew Maxwell, Director of Bergeron Entrepreneurs in Science and Technology

Course Outline (*subject to finalization by January 4, 2023*)
Bergeron Entrepreneurs in Science and Technology (BEST Lab)
Lassonde School of Engineering, York University

Course Description

Innovation + Creativity (ENG 1500) is a **blended** (2 hours synchronous, 1 hour asynchronous) course designed to better prepare you for the workplace – whether it be in a not-for-profit, an existing industry organization, or your very own start-up venture. This 12-week experiential learning journey draws insights from global experts, will help you develop design thinking and creative problem-solving skills to help you achieve your personal goals, and make an impact on your family, your community and society as a whole. This course is ideal for anyone interested in solving complex problems, improving their personal or team effectiveness, and/or running a business.

By the end of the course, you will

- Be prepared to work with teams of people from differing backgrounds
- Understand how to identify and define important problems
- Be better prepared to develop innovative ideas that address those complex problems.
- Develop the skills necessary to compete for jobs in an increasingly volatile, uncertain, complex and ambiguous environment.

Note that blended format means 2 hours of in-person lectures and 1 hour of asynchronous videos to be watched outside of class time.

Enrolment

This elective course is available for credit (3 credits) to any undergraduate student at York University, **including** Computer Science students. This excludes those enrolled in undergraduate engineering (B.Eng.) degree programs (**anti-requisite: ENG 1101/1102**). However, any undergraduate **and** graduate students in Lassonde School of Engineering may **audit** this course (0 credit, please contact the instructor to be placed on waitlist). All students completing the course will receive a Certificate of Completion and digital credential from Lassonde Professional Development program. Maximum enrolment is 100 students, first come first serve.



Course Learning Objectives

By the end of the course, you will be able to:

1. Discuss existing theories, frameworks, and case studies regarding innovation, creativity, entrepreneurship and problem solving [Knowledge]

Team/Individual

2. Assess barriers to creativity and innovation at individual and team levels [Analysis]
3. Apply strategies to address barriers to creativity and innovation [Implementation]
4. Use available tools and methods to create, reflect on, and present ideas for innovation [Synthesis]
5. Effectively contribute to peer learning and team performance, in innovation and problem solving processes [Impact]

Organizational

6. Develop and design implementation strategies (and documentation) for business / entrepreneurship (including pivoting) [Implementation]
7. Assess and articulate an organizational / social impact of a particular innovation and/or a business strategy [Impact]

Format & Lectures (Keele Campus, W 16:30-18:30, BRG 217)

1. Introduction: Why creativity? Why innovation?

The main goal of this session is to clarify the distinct meanings and relationships between creativity, innovation, problem solving, and entrepreneurship. This session will also aim to identify your own learning approaches, strengths, and development goals, in order to facilitate reflection, team formation, learning plan, and peer mentorship. Importantly, this session will set the context for the course, and help you recognize what you would like to get it out (and ways that you can do this). The course is a unique online course in that you will be interacting on-line (not just getting content online) so you will get the chance to meet those involved in putting the course together, along with all the peers in your cohort (who you will have to work with in team and group projects).

Learning outcomes:

- Why take innovation and creativity
- Challenges to innovation
- Challenges to creativity
- Learning about yourself
- Personal learning journey



2. Creativity

In this session, the focus will be on learning about techniques, ideologies, and processes improve and inhibit the depth of one's creativity, which is one of the most critical skills for career success in a time when knowledge is ubiquitous (if you don't know what that means ask google!). You will learn about different types of creativity, and your own personal creativity profile. We will introduce the four P's of creativity, and provide some insights into how you might overcome common barriers to creativity. We will also introduce the concept of innovation, and explain why it is different than creativity. Importantly, we will discuss the relationship between creativity and innovation (creativity is necessary for innovation but not sufficient) and how you can use your creativity and some of the tools and approaches we share in the course to become more innovative (yes you can become more creative and more innovative!).

Learning outcomes:

- The four elements of creativity and why we should care about it
- Creativity Enhancing techniques
- Barriers to creativity
- The link between creativity and innovation

3. Design thinking

This session explains the basic approach to coming up with new solutions using a Design Thinking approach: often called a human centred perspective. This approach to problem solving (pioneered by Stanford's DSchool) looks at solving a problem (opportunity) from the perspective of improving the user experience, rather than looking at improving a product or service, or offering a new one, based on traditional features and benefits. The design thinking approach is a five-step approach, that starts by asking you to use empathy to put yourself in the position of the user in order to identify their physical and their emotional needs. Design Thinking encourages you to create solutions that are desirable and better match user needs of the user (often in ways that are not simple incremental improvements over existing approaches). Other stages in the Design Thinking process include prototyping and validating.

Learning outcomes:

- The concept of Design Thinking & Human Centred Design
- Design Thinking as a different approach to innovation
- The link between Design Thinking and the Creative Problem-Solving Process
- The steps of Design Thinking
- Learn how to deploy the Jobs To Be Done Framework in Design Thinking
- Learn how to create Personas

4. Problem identification



This lecture will introduce the group project that you will work on during the course, by helping you identify a problem you want to work on. In reality, identifying a good problem is critical to the creative problem solving process (which you will learn more about in the next session). The idea is to help you find a problem that you care about, is clearly defined (and therefore solvable) and that you can come up with a feasible solution during the course. At the start of the lecture you will be asked to identify a problem you would like to work on, you will get feedback from the group (in person) and then online. Subsequently, you will iterate the problem until it becomes one that you can build a group around. Over the following week, you will each be tasked with choosing your group (which can mean giving up your problem to work on someone else's). Bring your passion to work on a problem you would like to solve...

Learning outcomes:

- The difference sources you may find problems to solve
- The Goldilocks problem statement
- Develop a How Might We statement

5. Creative problem solving process

We all need to solve problems everyday, in some cases we need to solve these problems creatively, to come up with new solutions based on what we know (and we know that sometimes this is easier (and you come up with better solutions) when you can involve someone else. In the workplace, or in university, there is often a team of people who can work with you on solving a problem, understanding the creative problem solving process, and how to get the most out of your team, will help you consistently come up with better solutions, more rapidly. In this session, we will introduce the eight steps of the creative problem solving process, explain that each of us has preferred problem solving styles (you will get to discover your own), and share insights into how knowledge of the process and your preferred style can improve your creative problem solving ability.

Learning outcomes:

- The innovation journey involves a repeated cycle of divergent and convergent
- Rules to follow for best problem-solving outcomes
- Min Basadur's version of the creative problem-solving process

6. Solution development & Hypothesis development

This lecture will help you come up with possible solutions to the problem you have identified as a group. This is called ideation, and we will share two approaches to help your team identify new ways to solve your problem and then to choose between them, to come up with the best one. You will get the opportunity to share your initial group ideas with your peers and get their feedback to improve on your initial idea or to recognize a fatal flaw that might mean a do-over. A final reality check when developing a solution is that it is viable, that you can provide the solution economically to users. Bring your creativity to come up with new solutions for your project and others in the class...



Once you have clearly defined a problem, and come up with a solution, or several solutions, you need to decide which one to recommend or to implement. It is at this stage that we see the power of the Design Thinking process, as we ask you to build a prototype of your idea to get feedback on it. A prototype is designed to test a specific hypothesis you have developed about how well your proposed solution addresses the problem you identified. Importantly, prototypes are designed to allow you to test this as rapidly and at as low cost as possible, because many times your first prototype will fail, or provide an insight that means your actual solution is quite different. Bring your critical thinking skills and action orientation to a hands on prototype testing session..

Learning outcomes:

- Tools for solution development
- Ideate possible solutions
- Building a prototype to get feedback
- Develop hypotheses to test effectiveness of solution

7. Entrepreneurship

Entrepreneurship is linked to innovation and creativity, as it is often used as a way for people to take innovative solutions to market. However, there are many different types of entrepreneurial ventures, and different motivations for entrepreneurship, which we will explain. Importantly, entrepreneurship is an increasingly important career choice for individuals, in part because there is a trend towards starting your own business in fields where previously employment was the only option, in part because there are not as many jobs in large organizations, and in part because new ventures are often required to launch new technology businesses. More than anything, entrepreneurs often view their ventures as the physical embodiment of their desire to make an impact, take control of their destiny and fulfil their own vision.

Learning outcome:

- Incremental innovation versus Disruptive innovation
- Motivation for entrepreneurship
- Different type of entrepreneurs
- Common entrepreneurial attributes
- Venture creation process

8. Resilience & Reflection

Increasingly, we are learning about how you can learn to become more innovative and creative, which is a combination of the context in which you are trying to be creative, your natural predisposition to creativity, your understanding (learned through reflecting on your experiences) of the creative problem solving process, and your ability to adapt how you behave in situations where creativity is required. In addition to understanding the stages of the process we have already described, there are two specific skills that you can develop which can enhance your creativity (and capacity for innovation): building your resilience [ability to bounce back after failure] and learning through reflection [and adapting your future behaviours based on prior experience]. In this session we will discuss techniques that can help you with each of these.



9. Implementation, using the Barriers to Adoption Framework

In this lecture we will use a framework to help you better predict the challenges you will likely face from users in introducing your new idea to the market. Assuming that you have developed a solution that is desirable, feasible and viable, you need to understand that encouraging individuals and organizations to adopt a new solution (especially from a new supplier) is challenging. During the lecture we will look at the various people and various reasons that can make adoption difficult, and explore alternate ways to overcome these barriers to adoption. We will include a discussion on alternative business models, and the case for starting a new business compared through selling the solution through an existing organization.

Learning outcomes:

- Definition of value proposition
- Functional and emotional benefits/cost of user adoption
- How to increase value proposition by modifying technology or business model

10. Innovation

Although this course focuses on how to build your personal innovation and creativity, it also discusses how you might implement your innovative idea, for example through the creation of a new venture. However, for many of us, creating a new venture is not desirable, or even feasible, for example if you want to see your innovative idea implemented in a large existing organization (or do not wish to be an entrepreneur. In these cases, it becomes important to understand how to innovate in a large organization. It is a fact that most large organizations recognize the need to become more innovative to survive and respond to new opportunities or threats. Innovating in a large organization is challenging because they suffer from innovation inertia - a resistance to change and do new things, in part because their traditional activities have contributed to their past success, and in part because their culture is risk averse (and innovation always involves a level of risk). We discuss how and why older organizations tend to struggle to innovate.

Learning outcomes:

- Types of innovation
- Challenges to innovation
- 4 roles in the innovation process
- Five elements of innovator DNA

11. Innovation management

Given the challenges of innovating in large organizations, and the fact that traditional management techniques and processes tend to discourage innovation, a new discipline, innovation management, is being used to help organizations professionalize the way they become more innovative. In this session, we introduce the basic principles of innovation management, during which we discuss the impact on innovation of: leadership, culture, resources, process and partnerships on an organization's "Innovation Quotient" - ability to take advantage of innovation opportunities. We specifically discuss the importance of introducing innovation processes to capture, select and implement innovative ideas in a more formal manner. We will also discuss factors that influence the likelihood of a formal innovation process being successful.



Evaluation

This course aims to enable your creativity and innovation in your current (or planned) practice. The quality of your deliverables are assessed on holistic criteria, as provided in individual rubrics. Overall, the course grades are distributed as follows:

Online Module Completion <ul style="list-style-type: none">• Includes quizzes & micro-credentials• Any online activity assigned	25%
Team Project	55%
Personal Reflections	10%
Participation	10%
Total	100%

- *Submission* of work in all major categories is **required** to earn the course credit. (For example, 0% attendance will be considered unfulfilled course requirements.)
- Please review the details of the assessment categories below.

Online Modules

There will be multiple choice questions throughout online modules to help clarify important concepts. You have unlimited attempts on these questions; however, correct responses are required for the subsequent module to be made available (and for course completion). Similarly, you are required to complete the learning journal to pass the course (this includes providing an interim report and a final report - see below).

Team Project

During the course, we will ask you to work on an innovative project to solve a problem you care about. The project will consist of seven stages...

1. Individual identification of potential project topics (e.g. linked to SDGs, or other provided frameworks and themes generated from class)
2. Selection of project teams
3. Definition (and redefinition) of problem
4. Identification of possible solutions
5. Implementation plan and challenges
6. Final presentation - kickstarter video
7. Team and personal reflection

We believe that one of the best ways for you to learn is by providing feedback to others in the class. After each submission, you will receive anonymous submissions from others in the class, together with a marking rubric. You will get the opportunity to provide some simple grading (and more importantly feedback) to each other. Typically each review will take you 15 minutes to complete. Note that you will each (individually) be required to account for your contributions to the project.



Personal Reflection (Learning Journals)

To reinforce student learning, we will ask you to complete a series of questions, and insights each week. These are designed to help you focus on what you have learned (not content but perspective changing). It is important that you complete these each week, likely shortly after you have completed an assignment or attended a lecture. The learning journal explains the process of reflective learning, and how you can use it to enhance your learning experience. The learning journal is your private document, and will not be graded, we just want to check that you use it. However, we will ask you to complete an interim page and the final reflection page and send it to us (to complete the course). These will require about 15 minutes each week, plus 30 minutes for the summary documents.

- Please continue to the next page for course policies and institutional resources -



NETiquette – Communication expectations

In all online communications (e.g., email, online discussion, or other forms of online communications), please **identify yourself as a student** registered in this course by providing your student number in your signature block.

Consider the guidelines from the Core Rules of Netiquette

(<http://www.albion.com/netiquette/corerules.html>) by Virginia Shea. Sometimes, online behaviour can appear to be inappropriate or disrespectful, such that it requires attention and follow up. In this case, please make sure you let your instructor know immediately so that the right resources can be identified to help. You are responsible for ensuring you are receiving official course information in an efficient and timely manner.

Accessibility, Academic Support and Accommodations

Please visit <https://accessibility.students.yorku.ca/academic-support-accomodations> for information on how to assess any needs and request arrangements. Please contact the course instructor for any temporary accommodation needs, e.g. schedule conflict with conferences, unexpected absences due to sickness (with doctor's note).

- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Religious observance accommodation
- Recording of lectures/seminars is permitted only with the prior written consent of the instructor/guest speaker or if recording is part of an approved accommodation plan.

Academic Integrity

Please visit <https://spark.library.yorku.ca/academic-integrity-why-is-academic-integrity-important/> for more information and resources.

- Senate policy on academic honesty and the academic integrity website (<https://www.yorku.ca/secretariat/policies/policies/academic-honesty-senate-policy-on/>)
- Avoid any behavior that could result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.
- In the event that you collaborate on a piece of work with another student – you should indicate this on your report, and explain the extent (who contributed which parts) and nature of the collaboration briefly.

Other Reminders

- Ethics review process for research involving human participants (<https://www.yorku.ca/research/research-ethics/>)
- Code of Student Rights & Responsibilities (www.yorku.ca/oscr/codeofrr.html)
- Additional resources related to add/drop courses, student life, academic resources, campus services, ...etc. can be found at this link: <http://www.yorku.ca/yorkweb/cs.htm>