Western University
Faculty of Engineering
Thompson Centre for Engineering Leadership and Innovation

ELI 9300 – Design Driven Innovation

COURSE OUTLINE 2022-2023

DESCRIPTION

This course provides students with the opportunity to explore the interplay between innovative design and commercial success. Students will apply a human-centered design approach to understand why technologies succeed/fail, and to investigate how design iteration can lead to innovation when used as a tool to elicit and test a customer's unspoken needs.

ENROLLMENT RESTRICTIONS

Enrollment in this course is restricted to graduate students in the Graduate Diploma in Engineering Leadership and Innovation, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

INSTRUCTOR CONTACT INFORMATION

Course instructor: Dr. Jacob Reeves, Ph.D.
Email address: jreeves5@uwo.ca
Office hours: By appointment (flexible) – ACEB 3459

COURSE FORMAT

The course will be delivered face-to-face.

COURSE LOCATION/TIME

Wednesday mornings from 9:30am-12:30pm, in SEB 2099

Course delivery with respect to the COVID-19 pandemic

Although the intent is for this course to be delivered in-person, the changing COVID-19 landscape may necessitate some or all of the course to be delivered online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any assessments affected will be conducted online as determined by the course instructor.

When deemed necessary, tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide personal information (including some biometric data) and the session will be recorded. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: https://remoteproctoring.uwo.ca.

TOPICS

Topic #	Description	Learning Activities	Tentative timeline
1	**Innovation Process**		
	Lesson 1: What is Innovation?	• Lectures • Additional reading material	Weeks 1-2
2	**Human-Centered Design**		
	Lesson 1: Design Thinking and Human-Centered Design	• Lectures • Additional reading material	Weeks 1-2
	Lesson 2: Insight Gathering	• Lectures • Problem Log	Weeks 1-4
	Lesson 3: Insight Statements	• Lectures • Interview assignment	Week 5
3	**Understanding Your Customer**		
	Lesson 1: Customer Personas	• Lectures • Additional reading materials	Week 3
	Lesson 2: Customer Interviews	• Lectures • Workshop activities • Interview assignment	Weeks 4-7
	Lesson 3: Emotional Design + Empathy	• Lectures • Workshop • Additional readings	Weeks 5, 9
4	**Prototyping for Design Feedback**		
	Lesson 1: Hypothesis Driven Experimentation	• Discussion • Additional readings • Assignment	Weeks 6-9
	Lesson 2: Rapid Prototyping for Innovation	• Lesson • Workshops • Assignment	Week 6
	Lesson 3: Ideation + Hypothesis Sprint	• Lessons • Workshops • Assignment	Weeks 7-9
	Lesson 4: Running a Feedback Session	• Lesson • Workshops	Weeks 7, 11
5	**Impediments to Customer Driven Design**		
	Lesson 1: Improving Innovation	• Lessons • Additional readings • Reflection assignment	Weeks 9-12
	Lesson 2: Open-Source Innovation	• Lessons • Discussion	Week 10

SPECIFIC LEARNING OUTCOMES

Degree Level Expectation	Weight	Assessment Tools	Outcomes
Depth and breadth of knowledge	20%	• Class Contribution • Reflections + Discussions • Insights Report • Feedback Report	• Ability to identify the difference between innovation and invention, and interpret each in the context of engineering organizations • Understanding the major stages of the innovation process and leading their implementation • Understanding of the role of human-centered design in the innovation process • Manage and promote innovation in organizations • Understanding the value in utilizing hypothesis-focused prototypes to elicit customer insights • Identify the emotions evoked by design
Research & scholarship	15%	• Class Contribution • Interview Assignment • Project Reports	• Synthesize innovation literature and suggest improves to practice within teams and organizations • Ability to utilize empathy and interviews to elicit and identify unmet needs • Ability to identify the critical customers, collaborators and pathways needed to move design from invention to innovation • Ability to identify non-obvious users who may impact technology adoption
Application of knowledge	35%	• Class Contribution • Persona Report • Ideation Workshop • Feedback Workshop	• Ability to initiate an innovative and customer-centric design process, and adapt innovation methods to unique circumstances • Ability to use a coherent approach to construct customer personas and problem storyboards • Ability to participate in/lead an ideation session • Ability to develop rapid prototypes and tests to capture customer feedback in response to design hypotheses/assumptions • Resolve conflict in a team environment when multiple solutions arise
Professional capacity / autonomy	5%	• Class Contribution • Interview Assignment • Feedback Workshop	• Defends own solutions and ideas in a professional and respectful manner • Ability to lead a user interview to elicit insights • Integrates reflection into his/her learning process • Integrates empathy into his/her design process
Communication skills	15%	• Class Contribution • Project Reports • Case Study Discussions • Interview Assignment	• Ability to articulate evidence in support of defining a customer persona • Ability to clearly articulate the profile of a potential customer and their unique needs • Ability to communicate the innovation process steps effectively to business and technical/engineering audiences
Awareness of limits of knowledge	10%	• Class Contribution • Feedback Presentation • DT in Practice Reflection	• Awareness of the need to acknowledge assumptions and hypotheses in testing proposed solutions • Ability to acknowledge the limitations to the application of theoretical HCD processes in industrial/academic settings • Ability to find additional resources and knowledge to implement innovative practices in engineering projects

ASSESSMENTS

Assessment Type	Material Covered	Tentative Due Date	Weight
Class Contribution (Participation in class activities) (Class preparation questions)	All topics	Ongoing	20%
Class Logbook (Weekly reflections)	All topics	Week 6 (feedback) Week 11 (for marking)	15%
Course Project	Topics 2 – 4		55%*
Need, Map + Persona Report (Team)	Topics 2 + 3	Week 4	
Interview Reflection (Individual)	Topics 2 + 3	Week 7	
Interview Insights Presentation (Team)	Topics 2 + 3	Week 7	
Prototype Plan Reflection (Individual)	Topic 4	Week 10	
Ideation + Hypotheses Report (Team)	Topic 4	Week 10	
Feedback + Improvements Presentation (Team)	Topic 4	Week 12	
Design Thinking in Practice Reflection Paper (Individual)	Topic 5	Week 11	10%

* 37% team deliverables, 18% individual deliverables

Late Submissions:

- Assignments submitted within 24 hours of the due date/time will be accepted, but will receive a flat 20% deduction from the final mark
- Assignments submitted 24 hours or more after the due date/time will not be accepted unless official accommodations are provided

Activities in which collaboration is permitted:

- Course project team deliverables
    - Problem Map + Persona, Interview Insights, Ideation + Hypotheses, Feedback + Improvements
        - Teams should write/edit report together and divide/collaborate to develop and execute necessary tasks
- Course project materials development (Interview questions, Interviews, Prototype development, Feedback session, *etc*.)
        - Teams are expected to divide work equitably then synthesize findings together

Activities in which students must work alone (collaboration is not permitted):

- Class contribution pre-class questions
- Class notebook
- Interview reflection, Prototype plan reflection
- Design thinking in practice reflection paper

REQUIRED TEXTBOOK

Ivey Publishing Course Pack (print copy or digital download copy instructions will be provided in class)

OPTIONAL COURSE READINGS

Copies of additional material, beyond the course pack, will be provided in class.

CHEATING, PLAGIARISM/ACADEMIC OFFENCES

Academic integrity is an essential component of learning activities. Students must have a clear understanding of the course activities in which they are expected to work alone (and what working alone implies) and the activities in which they can collaborate or seek help; see information above and ask instructor for clarification if needed. Any unauthorized forms of help-seeking or collaboration will be considered an academic offense. University policy states that cheating is an academic offence. If you are caught cheating, there will be no second warning. Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. Academic offences are taken seriously and attended by academic penalties which may include expulsion from the program. Students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence at the following website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

CONDUCT

Students are expected to follow proper etiquette to maintain an appropriate and respectful academic environment. Any student who, in the opinion of the instructor, is not appropriately participating in course activities and/or is not following the rules and responsibilities associated with the course activities, will be reported to the Associate Dean (Graduate) (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Associate Dean (Graduate), the student could be debarred from completing the assessment activities in the course as appropriate.

HEALTH/WELLNESS SERVICES

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several health and wellness related services

to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Faculty of Engineering has a Student Wellness Counsellor. To schedule an appointment with the counsellor, contact Kristen Edwards (khunt29@uwo.ca) via confidential email and you will be contacted by our intake office within 48 hours to schedule an appointment.

Students who are in emotional/mental distress should refer to Mental Health@Western: http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

SICKNESS

Students should immediately consult with the Instructor (for a particular course) or Associate Chair (Graduate) (for a range of courses) if they have problems that could affect their performance. The student should seek advice from the Instructor or Associate Chair (Graduate) regarding how best to deal with the problem. Failure to notify the Instructor or the Associate Chair (Graduate) immediately (or as soon as possible thereafter) will have a negative effect on any appeal. Obtaining appropriate documentation (e.g., a note from the doctor) is valuable when asking for accommodation due to illness.

Students who are not able to meet certain academic responsibilities due to medical, compassionate or other legitimate reason(s), could request for academic consideration. The Graduate Academic Accommodation Policy and Procedure details are available at:
https://www.eng.uwo.ca/graduate/current-students/academic-support-and-accommodations/index.html

ACCESSIBLE EDUCATION WESTERN (AEW)

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program. Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW): http://academicsupport.uwo.ca/accessible_education/index.html

AEW is a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.