

## **ELI 9300 – Design Driven Innovation**

**COURSE OUTLINE 2023-2024**

---

### **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](mailto:jreeves5@uwo.ca)

Office hours: By appointment (flexible) – Virtual

### **COURSE FORMAT**

The course will be delivered face-to-face.

### **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
<b>1</b>	<b>Innovation Process</b>		
	Lesson 1: What is Innovation?	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Additional reading material</li> </ul>	Weeks 1-2
<b>2</b>	<b>Human-Centered Design</b>		
	Lesson 1: Design Thinking and Human-Centered Design	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Additional reading material</li> </ul>	Weeks 1-2
	Lesson 2: Insight Gathering	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Problem Log</li> </ul>	Weeks 1-4
	Lesson 3: Insight Statements	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Interview assignment</li> </ul>	Week 5
<b>3</b>	<b>Understanding Your Customer</b>		
	Lesson 1: Customer Personas	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Additional reading materials</li> </ul>	Week 3
	Lesson 2: Customer Interviews	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Workshop activities</li> <li>• Interview assignment</li> </ul>	Weeks 4-7
	Lesson 3: Emotional Design + Empathy	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Workshop</li> <li>• Additional readings</li> </ul>	Weeks 5, 9
<b>4</b>	<b>Prototyping for Design Feedback</b>		
	Lesson 1: Hypothesis Driven Experimentation	<ul style="list-style-type: none"> <li>• Discussion</li> <li>• Additional readings</li> <li>• Assignment</li> </ul>	Weeks 6-9
	Lesson 2: Rapid Prototyping for Innovation	<ul style="list-style-type: none"> <li>• Lesson</li> <li>• Workshops</li> <li>• Assignment</li> </ul>	Week 6
	Lesson 3: Ideation + Hypothesis Sprint	<ul style="list-style-type: none"> <li>• Lessons</li> <li>• Workshops</li> <li>• Assignment</li> </ul>	Weeks 7-9
	Lesson 4: Running a Feedback Session	<ul style="list-style-type: none"> <li>• Lesson</li> <li>• Workshops</li> </ul>	Weeks 7, 11
<b>5</b>	<b>Impediments to Customer Driven Design</b>		
	Lesson 1: Improving Innovation	<ul style="list-style-type: none"> <li>• Lessons</li> <li>• Additional readings</li> <li>• Reflection assignment</li> </ul>	Weeks 9-12
	Lesson 2: Open-Source Innovation	<ul style="list-style-type: none"> <li>• Lessons</li> <li>• Discussion</li> </ul>	Week 10

## SPECIFIC LEARNING OUTCOMES

Degree Level Expectation	Weight	Assessment Tools	Outcomes
<b>Depth and breadth of knowledge</b>	20%	<ul style="list-style-type: none"> <li>• Class Contribution</li> <li>• Reflections + Discussions</li> <li>• Insights Presentation</li> <li>• Feedback Presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to identify the difference between innovation and invention, and interpret each in the context of engineering organizations</li> <li>• Understanding the major stages of the innovation process and leading their implementation</li> <li>• Understanding of the role of human-centered design in the innovation process</li> <li>• Manage and promote innovation in organizations</li> <li>• Understanding the value in utilizing hypothesis-focused prototypes to elicit customer insights</li> <li>• Identify the emotions evoked by design</li> </ul>
<b>Research &amp; scholarship</b>	15%	<ul style="list-style-type: none"> <li>• Class Contribution</li> <li>• Interview Assignment</li> <li>• Project Reports</li> </ul>	<ul style="list-style-type: none"> <li>• Synthesize innovation literature and suggest improves to practice within teams and organizations</li> <li>• Ability to utilize empathy and interviews to elicit and identify unmet needs</li> <li>• Ability to identify the critical customers, collaborators and pathways needed to move design from invention to innovation</li> <li>• Ability to identify non-obvious users who may impact technology adoption</li> </ul>
<b>Application of knowledge</b>	35%	<ul style="list-style-type: none"> <li>• Class Contribution</li> <li>• Persona Report</li> <li>• Ideation Workshop</li> <li>• Feedback Workshop</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to initiate an innovative and customer-centric design process, and adapt innovation methods to unique circumstances</li> <li>• Ability to use a coherent approach to construct customer personas and problem storyboards</li> <li>• Ability to participate in/lead an ideation session</li> <li>• Ability to develop rapid prototypes and tests to capture customer feedback in response to design hypotheses/assumptions</li> <li>• Resolve conflict in a team environment when multiple solutions arise</li> </ul>
<b>Professional capacity / autonomy</b>	5%	<ul style="list-style-type: none"> <li>• Class Contribution</li> <li>• Interview Assignment</li> <li>• Feedback Workshop</li> </ul>	<ul style="list-style-type: none"> <li>• Defends own solutions and ideas in a professional and respectful manner</li> <li>• Ability to lead a user interview to elicit insights</li> <li>• Integrates reflection into his/her learning process</li> <li>• Integrates empathy into his/her design process</li> </ul>
<b>Communication skills</b>	15%	<ul style="list-style-type: none"> <li>• Class Contribution</li> <li>• Project Reports</li> <li>• Case Study Discussions</li> <li>• Interview Assignment</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to articulate evidence in support of defining a customer persona</li> <li>• Ability to clearly articulate the profile of a potential customer and their unique needs</li> <li>• Ability to communicate the innovation process steps effectively to business and technical/engineering audiences</li> </ul>
<b>Awareness of limits of knowledge</b>	10%	<ul style="list-style-type: none"> <li>• Class Contribution</li> <li>• Feedback Presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness of the need to acknowledge assumptions and hypotheses in testing proposed solutions</li> </ul>

		<ul style="list-style-type: none"> <li>Course Topics + HCD Reflection</li> </ul>	<ul style="list-style-type: none"> <li>Ability to acknowledge the limitations to the application of theoretical HCD processes in industrial/academic settings</li> <li>Ability to find additional resources and knowledge to implement innovative practices in engineering projects</li> </ul>
--	--	--	--

## ASSESSMENTS

Assessment Type	Material Covered	Tentative Due Date	Weight
Class Contribution (Participation in class activities) (Class preparation questions)	All topics	Ongoing	20%
Course Project	Topics 2 – 4		65%*
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	
Ideation + Hypotheses Report (Team)	Topic 4	Week 11	
Ideation Contribution + Peer Evaluations (Individual)	Topic 4	Week 11	
Feedback + Improvements Presentation (Team)	Topic 4	Week 12	
Course Topics + HCD Reflection Paper (Individual)	Topic 5	Week 10	15%

\*40% team deliverables, 25% 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

### Re-grade Requests:

- Students are expected to be diligent about reviewing their marks promptly following their release. Accordingly, all re-grade requests must be submitted using the re-grade request tool on Gradescope within 1-week of the grades being released.
- All re-grade requests must include the rationale for mark changes and must refer to specific elements of the student's work and rubric to justify the request.
- Note that re-grading can result in marks increasing or decreasing based on re-evaluation.

### **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 quizzes
- Interview reflection
- Course Topics + HCD Reflection

### **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](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>).

**Note on the use of generative AI:** ChatGPT, Bing and other AI content generators are not permitted to be used for creating content that is submitted for marks in this course since the use of AI generators does not constitute submission of original work.

## **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](mailto: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](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.