CARLETON UNIVERSITY
SCHOOL OF INDUSTRIAL DESIGN

COURSE OUTLINE IDES 4310C • CAPSTONE PROJECT • Fall-Winter (2023)

Instructor: **Juan Jimenez Garcia**

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Office Hours: by appointment

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Office Hours: by appointment

Course Time and Location:

Course time and location are subject to change. For the latest information please refer to Carleton Central under Student Services – Registration or Search Schedule: https://central.carleton.ca/prod/bwysched.p_select_term?wsea_code=EXT

Course Description

Application of design principles in a comprehensive design project. Problem area should be product-oriented and of sufficient complexity. Normally undertaken in consultation with off-campus organizations and/or industry. Supervised by faculty and/or sessional members.

Includes: Experiential Learning Activity.
Precludes additional credit for IDES 4300 (no longer offered).
Prerequisite(s): IDES 3302 or permission of the School of Industrial Design.
Studio and lectures six hours a week in Fall and twelve hours a week in Winter.

Learning Outcomes

By the end of this course, students will be able to:

1. Apply research methods to define a unique design problem.

2. Bridge their research to the development of an appropriate design proposal.

3. Evaluate their proposed design solution with relevant stakeholders reflective of practitioner behaviour.
4. Demonstrate a basic understanding and need for ethics to develop and evaluate appropriate designs.
5. Use appropriate methods and materials to develop and assess design solutions.
6. Produce a range of appropriate professional deliverables at each phase as reflected in the fields of design.
7. Establish a good working relationship with external partners, which includes receiving and incorporating feedback from partner groups.

Course Deliverables

These are the deliverables for this course. Please see 'Appendix A Course Description and Themes', 'Appendix B Course Schedule', and 'Appendix C Sprints' for more detailed information.

Fall Term – 40 % Final grade

Phase 0:	*Sprint 0: Kick-off. Course description, code of conduct, initial content.*
Phase 1:	*Sprint 1: Presentation of first project iteration - (10%)* TCPS 2: CORE-2022 Certificate
Phase 2:	*Sprint 2: Presentation of second project iteration* - (15%)
Phase 3:	*Sprint 3: Presentation of third project iteration* - (15%)

Winter Term – 60% Final grade

Phase 4:	*Definitive Design* – Prototype testing, usability experimentation, and user experience (15%)
Phase 5:	*Final Design* – Design testing, technical package (draft) (15%)
Phase 6:	*Final Documentation* – Design poster, design model, design video, technical package, process book (25%)

Participation and Professionalism (5%)

Student Access to Quiz, Test and Exam Papers

Examinations are for evaluation purposes only and will not be returned to the student.

Required Materials

Materials required for the course are listed below. You may be asked by your instructor to refer to Brightspace for a more comprehensive list of required materials.

Goodwin, K. (2009). Designing for the Digital Age: How to Create Human-Centered Products and Services.

Guy Andr Boy. (2012). Orchestrating Human-Centered Design. Springer Publishing Company, Incorporated.

Kumar, V. (2012). 101 design methods. John Wiley & Sons.

Martin, B., & Hanington, B. (2012). Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions. Rockport Publishers.

Preece, J., Rogers, Y., & Sharp, H. (2019). Interaction design: beyond human-computer interaction (Fifth Edition.). Wiley.

Spies, Marco. (2015). Branded Interactions: Creating the Digital Experience

Follet, Jonathan. (2014). Designing for Emerging Technologies: UX for Genomics, Robotics, and the Internet of Things

Chapman & Hall (2022) Meaningful Futures with Robots. Designing a New Coexistence

Computer Requirements

Please refer to the computer requirements on the School of Industrial Design Website. You may be asked by your instructor to refer to Brightspace for other information or requirements related to computer work.

http://www.id.carleton.ca/undergraduate/about-the-bid-program/computer-requirements

Individual/Group Work

Courses may include individual and group work. It is important in collaborative work that students clearly demonstrate their individual contribution.

Review/Presentation Attendance

Attendance at scheduled SID Reviews/Presentations is mandatory. These are equivalent to exams when indicated in the course outline. Failure to attend the Review/Presentation without reasonable cause will result in a grade of F. Students arriving late for the Review/Presentation or not remaining for the complete session without approval from the instructor, will be addressed on a case-by-case basis at the discretion of the instructor.

If you are not able to attend a Review/Presentation, foresee arriving late, or need to leave before it is complete, please email your instructor in advance explaining the reason for the situation. It is important that you provide a reasonable rationale for your absence, late arrival, or early departure. In the event of an illness or death in the family, you will be required to sign a form verifying your claim and this form is available through the SID administration office.

Late Submission of Lecture & Studio Deliverables

Students who do not hand in deliverables on time will have their earned grade reduced by 10% per day up to a maximum of 3 days.

Participation and Professionalism

Active participation and professional conduct (e.g. class discussion, consultations with instructors, work ethic, etc.) are important in lecture and studio courses and may be formally evaluated by a grade. Professionalism also includes Carleton's Policy on Academic Integrity described in more detail below with links to content that you are required to review.

Academic Integrity

Carleton's Policy on Academic Integrity is available at: https://carleton.ca/registrar/academic-integrity/ and covers the following topics:

*Plagiarism (*e.g. submitting work in whole or in part by someone else, failing to acknowledge sources through the use of proper citations when using another's work).

Test and Exam Rules **(**e.g. attempting to read another student's exam paper, speaking to another student even if the subject matter is irrelevant to the text, using material not authorized by the examiner).

Other Violations (e.g. improper access to confidential information, disruption in classroom activities, misrepresentation of facts for any academic purpose).

This policy governs the academic behavior of students. In industrial design, ideas and concepts come from a multitude of sources and may be modified and utilized in the design and development process. The student should reference such sources appropriately and it is strongly advised that you read Carleton's Policy on Academic Integrity prior to conducting any work at the University.

Requests for Academic Accommodation

You may require special arrangements to meet your academic obligations during the term. For an accommodation request for any of the below topics, refer to this link - https://students.carleton.ca/course-outline/ and open the needed section.

Topics:

- *Pregnancy Obligations*
- *Religious/Spiritual Obligation*
- *Academic Accommodations for Students with Disabilities*
- *Survivors of Sexual Violence*
- *Accommodations for Student Activities*
- *Academic Considerations for Medical and Other Extenuating Circumstances*
- *Scheduling and Examination Support*

Statement on Student Mental Health

As a university student, you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you, refer to this link - https://wellness.carleton.ca/ and open the needed section.

Topics:

- *Counselling*
- *Resource Guide*
    - *Thriving on Campus*
    - *Everyday Stress*
    - *Mild Mental Health Concerns*
    - *Moderate Mental Health Concerns*
    - *Complex Mental Health Concerns*
- *Umbrella Project*

Student Responsibility

The student is responsible for knowing the content of this course outline; the schedule of classes, assignments, and/or Reviews; and the material that was covered when absent. The studio is a professional environment and students should be working during the scheduled hours.

Unless otherwise arranged, the class will meet during scheduled class hours. Please note that attendance is important since issues and questions may be raised in class, and announcements made, along with information disseminated through Brightspace. As external professionals are often involved in our work, scheduling changes for guest lectures, presentations, and Reviews may occur at short notice, requiring students to stay informed.

Changes to the Course Outline

The course outline may be subject to change in the event of extenuating circumstances.

Appendix A - Course Description and Themes

IDES 4310C CAPSTONE PROJECT F22

Course Description

The Capstone project puts into practice what the students have learned over the last 4 years in the School of Industrial Design in a project that addresses a real context situation with significant complexity. The project follows an incremental, multi-phased approach with several iterative actions culminating in a series of deliverables. Students propose their own solutions considering the aspects of design research, human-centred design, innovation, critical analysis, human factors, theoretical references, prototyping,

technology, visual communication, historical, cultural, and aesthetic contexts. This final design is derived from a structured, yet not straight process, involving multidisciplinary knowledge from different sources.

Phases

The Capstone project consists of two main phases, each following a corresponding methodology: 1) Design Sprints (Scrum) + Pressure Cooker, and 2) Waterfall Process (see Appendix B).

Fall

In Scrum, a method widely used in several engineering and design disciplines, the solution is built in a series of iterations called sprints. Each sprint comprises the same design actions (see Appendix C) allowing the designer to iterate, and therefore, change and improve over time the entire design process from *"understanding", "ideate", "decide", "build", and "test"* with users. It offers an excellent opportunity to adopt an early user-centric and design-driven approach to your project. Moreover, this iterative approach helps overcome many of the recurring problems people often experience in more traditional methodologies. The process implements a "cooking pressure" dynamic, gradually providing more time to develop the entire project again in the following iteration (phase).

Once this last iteration (third) phase is completed, and you have a definitive design concept, the second stage follows during the Winter Term.

Winter

The Waterfall framework, a more sequential development, is focused on the solution where design aspects such as usability, aesthetics, structure, and functionality are tested and finalized. Building and testing prototypes are more intensive in this second phase. The final section of this phase is dedicated to preparing a communication strategy for both the process and the final solution in a variety of mediums. By the end of this phase, students are ready to present their work at the Grad Show.

Approach:

It's crucial to understand that our Capstone embraces several design disciplines. Your projects will gravitate around Interaction Design (IxD), Industrial Design (ID), and Experience Design (XD). Each industry partner's theme will focus on developing tangible products and services that enhance people's experiences (e.g., customers, students, merchants, citizens, etc.). These solutions will define how technology should be implemented based on the context and users' needs. My background in Human-Computer Interaction, Interaction Design, and Industrial Design, along with my experience in The Netherlands, enables me to offer a broader approach to design. Our scope extends beyond the traditional concept of UX, encompassing industrial design as well. Think of companies like Philips, a Dutch organization that creates industrial design solutions (household appliances, healthcare devices, personal care, IoT, etc.), at the intersection of IxD and XD, while gathering users' data to improve people's daily lives.

Themes

Four DRobotics Corporation - *Designing user experiences with hospitality robots.*

"How might we enhance human-robot interaction in everyday scenarios? Design user-centred solutions for hospitality robots across diverse environments like campuses, neighbourhoods, malls, hospitals, or homes"

Robots are more ubiquitous now than ever and we interact with them on a daily basis. They are no longer relegated to an assembly line, on the contrary, we could engage with them at grocery stores, malls, or homes. Robots are now more perceptive (via more sensors), make smart decisions (via onboard decision-making processes), and are more independent than ever (using integrated motors). While these features are increasing, there is a growing interest in exploring how we interact with these robots when they are part of our daily life. Robots were imagined and developed as a replacement for humans but are now seen as positive add-ons or assistive.

One emerging category within the robotics field is "hospitality robots" which find applications as service or companion solutions in various settings such as airports, university campuses, hotels, museums, extended care homes, sporting events, railway stations, and shopping malls. Unlike "fixed industry robots" that prioritize accuracy, repetition, and performance, hospitality robots emphasize stronger human-robot interaction. Thus, ensuring meaningful human experiences with these robots is increasingly crucial. The key challenge lies in centring the end-user during the design process, comprehending the problem space, and understanding the user's needs, desires, and intentions. This project primarily focuses on the human-interaction aspect, encompassing robot behaviours, aesthetics, and industrial and service design, rather than the technical intricacies of the solution.

In collaboration with Four Drobotics, a global frontrunner in customized autonomous vehicles for security, surveillance, and space applications, students will embark on an exploration of inventive design solutions, experiences, and/or services that enhance the interaction between users and hospitality robots in everyday life scenarios. These scenarios encompass diverse environments, including university campuses, neighbourhoods, shopping malls, homes, and much more.

Shopify, Retail Hardware- *Designing products and services to improve customer loyalty for brick-and-mortar merchants.*

"How might we design an innovative solution that bridges the gap between brick-and-mortar and online retail experiences, leveraging customer data responsibly, to enhance customer loyalty and improve the overall customer service for physical stores?"

Brick-and-mortar retailers face several challenges in today's digital age. One key challenge is the increasing competition from online retailers, who have leveraged technology to provide convenient, personalized, and frictionless shopping experiences. Physical stores must find innovative ways to attract and retain customers by offering unique value propositions that go beyond mere product availability. Moreover, obtaining and effectively utilizing customer data poses another significant challenge, as retailers must navigate privacy concerns, consent issues, and the complexities of data analysis and application.

This project presents an exciting opportunity for design students to explore various aspects of customer experience, data-driven design, and retail innovation. Students can delve into designing customer-centric loyalty programs, intuitive interfaces for data collection, personalized shopping experiences, interactive in-store displays, or even innovative packaging and product designs that enhance customer engagement and encourage repeat purchases.

Design students have an opportunity to address current in-store challenges by creating solutions that bridge the gap between online and offline shopping experiences, leveraging customer data responsibly, and fostering meaningful customer engagement. In collaboration with Shopify, the world leader eCommerce platform, students will have the opportunity to explore, define, and design solutions that helps retailers to improve customer loyalty and get benefit from the collection of customer data, which in turn, will enhance customer service.

Benbria – Engage Everywhere – "Designing Next-Gen Customer Experience Data Collection"

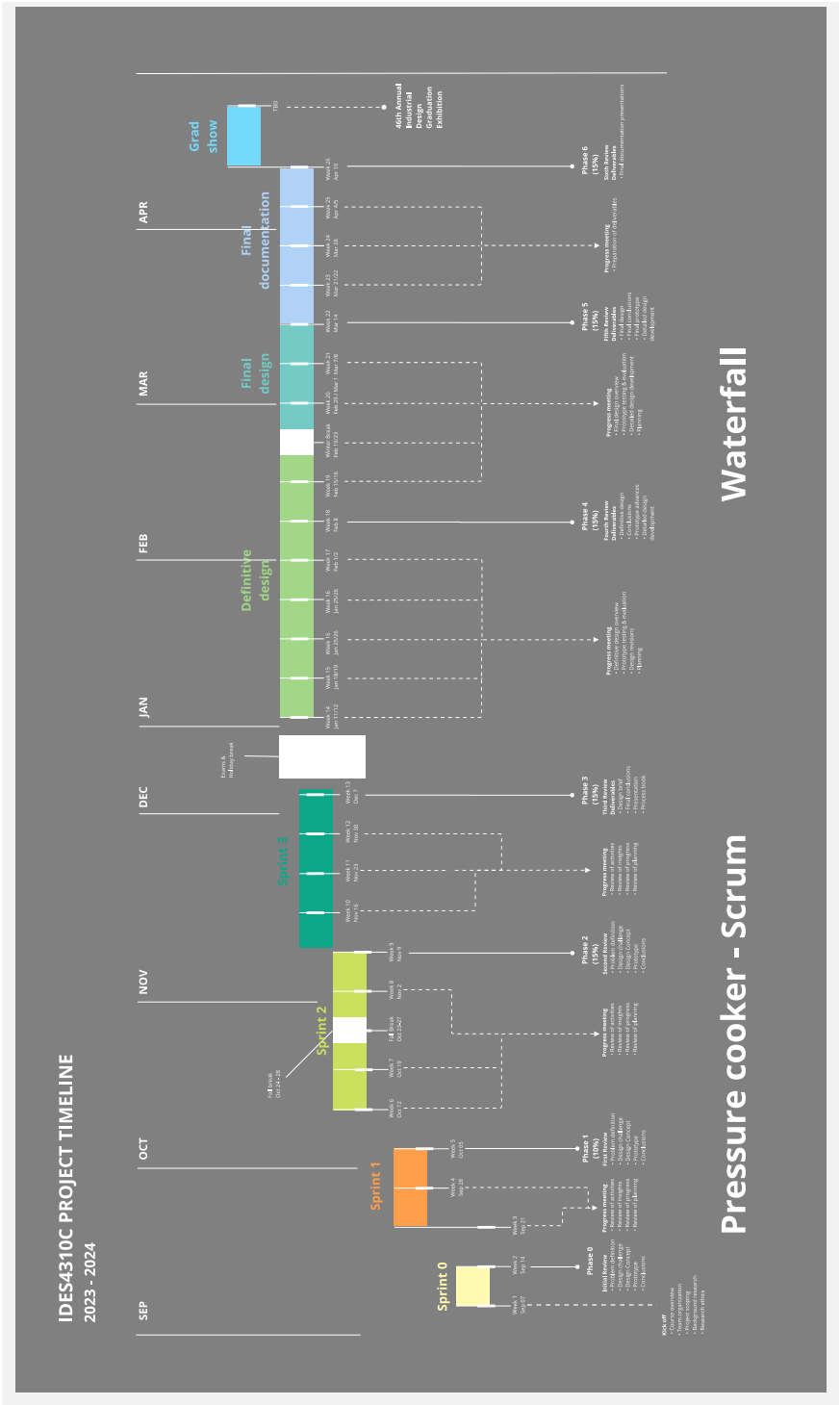
" How might we reimagine data collection methods in university campuses and transit environments to uncover rich insights that drive strategic decision-making and enhance customer experiences?"

In today's dynamic and interconnected world, collecting and analyzing customer feedback has evolved into a cornerstone of business success and innovation. Modern-day consumers have more access to information, and therefore choice, than ever before, resulting in a highly competitive business landscape. Because of this, the practice of actively engaging with customers to meet their needs and expectations has become increasingly important for businesses to thrive. This process fosters a sense of customer loyalty and engagement while allowing businesses to uncover hidden insights that drive strategic decision-making. This symbiotic relationship between customer feedback and business growth underlines the truth that customer-centricity is not just an approach, but a necessity.

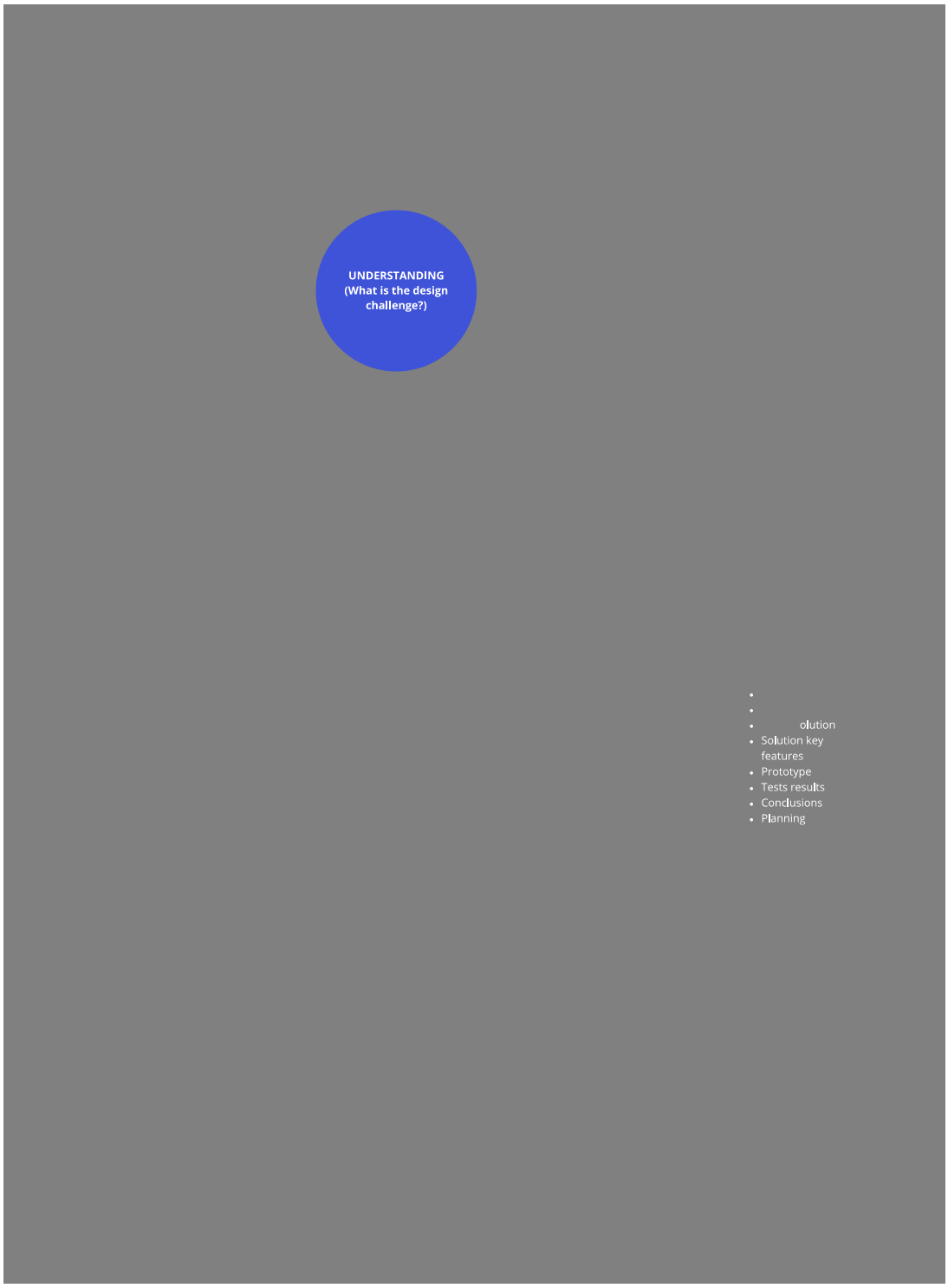
Customer feedback solutions can be applied in a broad range of industries and settings such as university campuses and transit. In higher education, feedback mechanisms offer both students and faculty a voice to share their opinions on the quality of services and offerings being provided on campus. Similarly, in transit, feedback mechanisms allow commuters to voice their thoughts on aspects such as scheduling, accessibility, and comfort. The challenge in both cases is effectively extracting these insights from customers. Traditional methods involve offering a survey hosted on a physical kiosk or digital platform; however, with modern technology, the opportunity to innovate within this space is vast and limitless. Through understanding customer touchpoints and tendencies within these environments, a more effective and engaging form of data collection can be designed, thereby resulting in the delivery of rich and powerful customer experience insights.

In collaboration with Benbria, a leader in customer experience and engagement solutions, students will explore innovative design solutions and strategies that enhance the company's methods of collecting and analyzing customer experience and satisfaction data. Students will have the opportunity to explore and innovate upon data collection methods in exciting and diverse settings including university campuses and transit.

Appendix B - Course structure (full size available in Brightspace)



Appendix C - Course structure (full size available in Brightspace)


UNDERSTANDING
(What is the design challenge?)
olution
Solution key features
Prototype
Tests results
Conclusions
Planning