CSC396Y Designing Systems for Real World Problems
Computer Science Summer Project 2025 – Study Abroad in Berlin

> **WARNING: This is not a typical computer science course.** There is a lot of written work and group work. If you want to learn a lot about UX, then take this course. **If you want a vacation & easy course, don't take it!**

COURSE INFORMATION & COMMUNICATION

Instructor   Prof. ILONA POSNER, ilona.posner@utoronto.ca
Teaching Assistant   ???

Quercus will be used for all course information & communication. **Email** via Quercus is the preferred method of communication with the professor. Students should **NOT expect immediate email responses**. Attempts will be made to respond to emails in about 24 business hours.
NOTE: The University & Quercus communicate with students using **only university email addresses.** Please, make sure that your **ROSI email** is correctly set to your university email address, for example your.name@utoronto.ca or that you have created a **functioning forward** on this email address, to ensure **you do not miss important course related announcements.**

COURSE DESCRIPTION

Human Centered Design results in robust solutions that successfully address real human problems. The Summer Abroad provides students with an opportunity to explore new environments, which improves their ability to see their own world with increased sensitivity and germinates new design ideas. Students will **identify a real-world problem** and **work in groups** on projects to address this problem. Students will begin by exploring their problem space and the people within that space, identifying users' needs, system constraints and requirements, and ultimately designing solutions that incorporate all those components. Designs will be iterated from initial concepts to valuable solutions by gathering feedback and usability testing design prototypes with users throughout the course. The course projects will culminate with development of a robust design that addresses the identified problem. Final project presentations will take place at the end of the course. There is NO FINAL EXAM.

COURSE OBJECTIVES

1. To introduce students to Human Centered Design, Design Thinking and User Experience Design. To introduce students to some research in these fields.
2. To give students experience in
    (a) exploring a problem space and thinking deeply about the space and the people impacted,
    (b) understanding target audiences, their current practices, and underlying needs,
    (c) iterating design ideas using various prototypes and thinking critically about designs from the users' point of view,
    (d) usability testing designs with real users and drawing implications from usability testing to improve the designs,
    (f) working in multidisciplinary design teams,
    (g) clearly and critically communicating research findings regarding the usability of designs and user experiences in the form of presentations and reports.
3. To instill in the students empathy for their future users, clients, and colleagues, in any work area.
4. To prepare the students for further work in related areas.

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FIELD TRIP DETAILS
1. **Berlin City Walking Tour** will be conducted with a guide upon arrival in Berlin
2. Visit to **Berlin's Technology Museum** to see historical technological artifacts
3. Visit to **Berlin's Musical Instruments Museum** to explore the evolution of musical technologies
4. Visit to **FUTURIUM**, the house of futures
5. Visit to Human Computer Interaction Lab in the **Hasso Plattner Institute at Potsdam University**
6. TWO DAY TRIP to **Volkswagen Factory at Autostadt** in Wolfsburg with an overnight stay and a visit to the **Phaeno Science Museum**

COURSE OUTLINE
The course is delivered in a number of stages where students take a single project idea and develop it into a design following an iterative user-centered design process.
- Individually propose a **problem space**, not a specific problem just yet.
- Review the Toronto Transit system using industry established Usability Heuristics
- Form groups of 5 students and choose **one problem space** to focus on with your group.
- Individually conduct **research** and a **literature review** of the chosen problem space.
- Compile individual research findings and choose **one problem** within the chosen problem space.
- Define your **target audience** and conduct **primary research.** The target audience should be easy to reach either in-person or online during the course.
- Compile research findings as a group, analyze the results, and develop **design guidelines.**
- Individually develop **low-fidelity prototypes** (hand-drawn on paper or using low-fi tools).
- Informally **usability test** individual low-fi prototypes, analyze the findings, and compile results.
- Combine individual insights from usability tests to develop your group's **high-fidelity prototype(s)**.
- Formally **usability testing** your high-fi prototype(s).
- **Update your design concepts** using insights from usability testing.
- Deliver **final design**, **documentation**, & project **presentation**.

In addition, this course aims to develop students' critical thinking regarding user experiences that surround them day-to-day. Students will need to reflect on their experiences in Berlin regarding the transit system and other aspects of their overall experience in Germany.

This course is delivered through a combination of lectures, critique sessions, and project presentations. This course depends on a significant amount of successful **group work**. Students will be expected to form groups at the start of the course and to work in these same groups for the duration of the course. In past similar courses, groups with students from diverse disciplines have been quite successful in producing creative, robust, and viable projects; thus, **multidisciplinary project groups are strongly encouraged.**

COURSE SCHEDULE ASSIGNMENTS & GRADES
This full-year Computer Science credit course has demanding curriculum requirements compressed into a short time span of 4 weeks in Berlin. Thus, students will have the **first class will take place on ZOOM on Monday, May 5, 6-9 PM**. Students will **complete assignments A0 through A4 prior to departing for Germany** while the rest of the assignments will be completed while in Berlin.

The course will follow the **Human/User Centered Design** approach that includes: **formative research** to explore the problem space and its current reality, **iterative design** to develop a solution in several phases with increasing detail using input from the target audience, and **summative research** to verify the proposed solution actually delivers on its promise. These components will comprise 75%.

This is a group project course so working successfully in a group is a requirement. The group work will be worth 50% of the course grade and the individual work will make up 50% of the mark, including 25% for course participation. The **course participation** grade will be determined by your contribution to group-work (using confidential peer feedback) and the instructor's evaluation.

DATES, ASSIGNMENTS, GRADES, & FIELDTRIPS, 2025

Dates	Class Da	Assign	Group & Individual Work Assignments	Individual	Group
May 4	SU	A0	**Post** on Quercus: Pitch a problem space & yourself to your class	•	
May 5	0　M		**FIRST CLASS** on ZOOM, **May 5, 6-9 PM** & GROUP FORMATION		
May 13	T	A1	**Post** Heuristic review of Toronto Transit system	4	
May 27	T	A2	**Post** Problem space, research plans, group form & agreement		2
May 27	T	A3a	**Post** Individual research paper proposal for A3	•	
June 10	T	A3b	**Post** Individual research plan & instruments for feedback	4	
July 8	T	A3c	**Post** Individual research results, paper review, competitive analysis, Berlin expectations	12	
July 19	SA		ARRIVE in BERLIN & Check-in Hotel		
			Week 1		
July 20	SU		**Visit** Berlin **City Walking Tour** & Welcome Dinner		
July 21	1　M	A3c	First class in Berlin. **Present** Individual research, <1 min timed	•	
July 22	2　T	A4a	**Present** Group combined results in class **Visit** in Berlin - **German Museum of Technology**, afternoon		4
July 23	3　W	A4b	**Post** Group Design Requirements, Experience Map, UX Strategy, Low-Fi prototype plans		10
July 24	4　R		**Present** A4b in class: Group Design Req's & UX Strategy, Plans **Visit** in Berlin - **Musical Instruments Museum,** afternoon		
			Week 2		
July 28	5　M	A5a	**Post** Individual low-fi prototypes & usability test plans **In class** Usability test individual low-fi prototypes	•	
		A5b	**Post** Individual low-fi test results		
July 29	6　T	A5b	**Present** A5b in class: Individual low-fi test results combined **Visit** in **Potsdam** - HCI Lab at Hasso Plattner Institute, in PM		
July 30	7　W		**In class** Internal Evaluations & **Group Accountability** Exercise **Visit** in Berlin – **Futurium** in the afternoon		
July 31	8　R		**In class** Functional Prototypes & Formal Usability Testing		
			Week 3		
Aug 3	SU		**Post** Group combined hi-fi solution & usability test plans		15
Aug 4	9　M	A6	**Present** A6 in class: Group combined solutions, internal evaluations, functional prototype(s), & usability test plans		
Aug 5	T		**Visit** to **Wolfsburg Volkswagen** departing early morning		
Aug 6	W		**Visit** in **Wolfsburg, all day** returning late evening		
Aug 7	10　R		**In class** Discuss Usability Test Results & Human Perception		
			Week 4		
Aug 11	11　M	A7	**Post** Group Usability Test Report, & prototype updates		7
Aug 12	12　T		**Present** A7 in class		
Aug 13	13　W	A8	**Present** A8 Group Project pitch in-class for practice & feedback		4
Aug 14	14　R		**Present** A8 Final Group Project pitch for guests. Last Class.		4
Aug 14	R	A9	**Post** Heuristic Eval, Research Reflections & Individ. Journals, & Group Meeting Docs	5	4
		A10	**Post** Peer review, Berlin retrospective, Course evaluation	•	
			Class Participation, +2% Bonus marks	25	
			TOTALS	50	50

IMPORTANT NOTES ABOUT ASSIGNMENTS & GRADES

Assignments: To optimize the pace of learning in the class, one project is divided into smaller assignments, submitted throughout the course. The first deliverable is due before midnight on **May 5**

and last deliverables on the last day. **All course deliverables are required and build on top of each other. Omitting any assignment would significantly disadvantage both the student and their group.** Individual assignments are to be completed individually, submitted for grading, and then shared with other group members. Group assignments require analysis of individual work, synthesis, and integration into a larger group submissions. Some assignments are graded, while others will receive feedback only.

Late Policy: An assignment due at 11:59 PM local time, if submitted at 12:05 AM is considered LATE. Submissions < 24 hours late incur a 25% penalty. Submissions < 48 hours late incur a 50% penalty. Submissions more than 48 hours late earn 0%. Exceptions to this policy are to be made only in extreme circumstances, with **communication in advance of the original deadline** and may require a medical certificate or similar document.

Remarking: Students requesting remarking of an assignment must do so in writing within 24 hours after receiving the assignment grades. Requests must include detailed reason & contact info. **Please note,** assignments submitted for remarking will be remarked fully and **may result in lower grades.**

AI & UX
If you use **AI Tools** in any assignment, you must provide details in the **Assignment Attribution section** and also include an **AI Appendix** with (1) **WHY** you wanted to use the AI Tools (2) **What PROMPT(s)** you used, and any iterations of these prompts, in the order they were used (3) **AI RESPONSES** with highlights indicating any parts you used in your assignment (4) **YOUR REACTION** satisfaction or dissatisfaction to the AI responses. **AI Appendix** will **not count** towards the assignment's **page limit**.

WRITTEN WORK
Your ability to conceive of, design, and implement new tools and new designs that truly meet the needs of you target audience depends critically upon your ability to communicate with these users. This requires effective writing and speaking skills. Assignments include **substantial written work and in-class presentations**.

Structure and organization, spelling, grammar, word usage, and document appearance will count for roughly 10% of your grade on the written work. **If assignments are not in satisfactory university-level English prose, they will be returned for rewriting.**

ACADEMIC OFFENSES
All the work you submit **must be original work done by you** individually or within your group. **Plagiarism is academic fraud and is taken very seriously, resulting in a ZERO grade or worse**. **WARMING**, using AI/ML/LLM augmented tools **without attribution** is considered to be Plagiarism. **Turnitin** will be used to check submitted assignments, it can detect if AI/ChatGPT was used.
Read **Plagiarism in CS** http://www.cs.toronto.edu/~fpitt/documents/plagiarism.html and
Arts & Science Code of Behaviour https://governingcouncil.utoronto.ca/media/15068/view

PROTOTYPING SOFTWARE
For this course you will use **your own computer**, and the software of your choice. Your group's **prototype** must be **viewable** in **any standard Web browser.** In the past, students have used Figma, Sketch, HTML, CSS, React Native, C++, Java, Invision, Adobe XD, and even PowerPoint to create their interactive prototypes. If you are planning to use any software not listed here, please **CONFIRM the acceptability of your chosen tools with the instructor BEFORE starting.**

INSTRUCTOR BIO

ILONA POSNER is a User Experience (UX) Consultant, Educator, and Coach. Starting in the field more than 30 years ago, she has seen it evolve from Human Computer Interaction (HCI), to Usability, UX and now to User Experience. She is constantly striving to improve people's experiences with technology by focusing on human needs and business goals, while accommodating technological constraints. Crossing industry boundaries, she has consulted in large corporations and startups, in different verticals including technology, finance, telecom, healthcare, transportation, and education.

An experienced educator, Ilona Posner has been teaching User Experience since 2000, through project-based design courses, at University of Toronto, OCAD University, and the Media Lab at the Canadian Film Centre, to thousands of students, in both the graduate and the undergraduate programs. She teaches UX Certification courses for Human Factors International since 2003. She also develops and delivers custom training courses for industry. Ilona Posner has been volunteering with TorCHI, the Toronto Chapter of the Computer Human Interaction professional interest group and running Student Design Competitions at International Conferences. Ilona holds a Master's Degree in Computer Science from the University of Toronto.

TA BIO – ???

The Teaching Assistant will grade assignment submissions and provide detailed feedback.

OPTIONAL PROJECT EXTENSIONS – CSC494H & Beyond

Previous students' course projects have been accepted and funded in innovation incubator programs. CSC494 may be available to students who have developed viable design ideas in CSC394 and want to **fully develop their designs into functional products.** Students will need to ballot to qualify for this course extension.

What Students Said About This Course

This course has altered past students' view of the field of Computer Science and has given them a new perspective on the importance of their user. The skills students gain can be applied in many areas of Computer Science, product design, and beyond. Students commented after the course:

This course gives us a new concept of computer science, it's interesting and worth learning.

It is a very intersecting course that I think everyone should take. The workload is high.

This course is very beneficial but for those who want to get this credit easily, I don't recommend it. However, for people who want to learn about user experience, this course is super helpful.

Berlin is a great place to see and this course taught us an important way to look at creating projects.

Reflecting allowed me to realize how much I have learned and grown throughout this journey and how I wouldn't change a thing. I noticed the change in my outlook on certain things in life thanks to the perspectives, cities, people and trips I was exposed to in the course. I have become much better at presenting, taking and applying feedback, staying motivated despite challenges, and motivating the people around me.

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Thank you, professor, for some wonderful discussions, challenging (but insightful) assignments, the snacks in class and overall, a very learnable environment!

I feel that I have gone on an interesting journey with my presentation skills in this course. I started out very nervous and slowly grew in both skill and confidence as the course went on.

I would definitely have taken this course; in fact, I would have been a lot more enthusiastic than I actually was. I loved the entire experience and I learned so much during the process.

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