Human-Computer Interaction CS4474/9552 Course Outline

1. Course Information

Title: Human-Computer Interaction (CS4474/CS9552)
Term: Winter 2023
Lectures: Mondays 2:30 - 5:30 PM
Location: Spencer Engineering Building (SEB) – Room 1200

List of Prerequisites
- CS3307

Unless students have either the requisites for this course or written special permission from their Dean to enroll in it, they may be removed from this course and it will be deleted from their academic record. This decision may not be appealed. Students will receive no adjustment to their fees in the event that they are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Name: Amir Haghighati (ahaghig3@uwo.ca)
Contact: course-related communications **only via OWL's Messages**
Office: MC 27D (in-person); Zoom (https://westernuniversity.zoom.us/my/amirhm)
Office Hours: Wednesdays 1:00 to 3:00 PM (please book an appointment through OWL)

3. Course Description, Schedule, and Delivery Mode

This course provides an overview of several areas in human-computer interaction (HCI). Broadly speaking, HCI is an interdisciplinary subject concerned with the design, evaluation, and implementation of interactive systems for human use and with the study of major phenomena surrounding how humans work with technology. HCI addresses any interaction with computers by humans, as users or developers, as individuals or as groups.

This course consists of in-person lectures, practice studio work, reading assignments, presentations, and a team-based project. Upon graduating from this course, students are expected to have theoretical knowledge of and practical experience in the fundamental aspects of conceptualizing, designing, and evaluating interactive systems that are useful and usable. Design of usable technology draws on knowledge of computer, information, cognition, and communication sciences. It is expected that students will become familiar with some of the literature in HCI and develop sufficient background in HCI issues to do more advanced work in this area.

Learning Objectives
- To identify and describe HCI concepts/terminology/issues used in the design and evaluation of interactive computing systems

- To design human-centered software, consciously incorporating and applying HCI principles in the design process
- To evaluate the effectiveness of a piece of software in the light of the discussed HCI principles
- To think deeply about users' needs and distinguish the differences between system-centered design and human-centered design

Some Lecture Topics

Topics covered in this course include, and are not limited to, the following:
- History and evolution of interactive systems
- Framework for designing interactive systems
- Human-centered interactive systems design
- Usability and evaluations
- Principles of design
- Metaphors in design
- Conceptual and mental models

Course Schedule

The table below is the timeline for this course and includes due dates for each component. For detailed description on each component, please see Section 4 of this document.

Date	Practice Studio # (75 mins)	Quiz # (45 mins)	Project Component	Reading Summary (Chapter #)
1/9				
1/16				1
1/23			Team Profile & Proposal	2
1/30				3
2/6	1	1		12
2/13	2		Design (storyboard & scripts)	4
2/20	Reading Week			
2/27		2		7
3/6	3			8
3/13	4			13
3/20	5	3		14
3/27			project group presentations: first half	16
4/3			Final project submission; project group presentations: second half	

Delivery Method

All of the components of this course will be delivered in-person.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely 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 remaining assessments will also be conducted online as determined by the course instructor.

4. Course-Specific Components

All course material will be posted to OWL: http://owl.uwo.ca.
Students are responsible for checking the course OWL site (http://owl.uwo.ca) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Textbook
Main resource: Sharp, Helen; Preece, Jennifer; & Rogers, Yvonne (2019). Interaction Design: Beyond Human-Computer Interaction (5th Ed.). Wiley.
Other resources:
- Norman, Donald; Berkot, Peter (2011). The Design of Everyday Things. Basic Books.
- Norman, Kent (2017). Cyberpsychology: An Introduction to Human-Computer Interaction. Cambridge University Press.

Lectures
Lectures will provide an overall formal framework for an understanding of the course materials. These in-person lectures supplement the materials in the textbook. Lecture notes will be shared with students after each class. Students need to study them carefully, as they provide them with important concepts they need to know for their projects and practice studios. If there is a change in the delivery mode, i.e., from in-person to online, it will be announced via OWL.

Email Policy
All course-related communications should take place inside OWL's Messages system. No emails from other accounts will be read or accepted. Upon receiving messages via OWL, the instructor and TAs will try to respond as soon as possible, but do not expect the answer to be immediate. Please do not expect replies to messages during weekends.

Reading Assignment Summaries
You have weekly readings from the textbook. A thorough and deep understanding of the readings is essential if you want to do well in other components of the course. These readings will help you contribute to and participate in class discussions knowledgeably and effectively. To help you keep up with the reading materials, you are required to submit a one-page summary of the assigned readings every week (see above). This summary should highlight and present the main issues or concepts discussed in the readings. You can do these summaries in whatever manner you think helps you understand the concepts. Those who do not submit their summaries will receive a zero mark for that reading summary. Those who submit their summaries will receive a full mark. These summaries will not be returned to you. You can calculate your mark for this component based on the number of summaries that you submit.

Quizzes
There will be 3 quizzes during the class (see above for dates). The main focus in these is to evaluate students' mastery over subjects covered in the course, as well their application in group projects. The questions will be drawn from all of the following: lecture notes, assigned readings, discussions from class,

and any other material provided/discussed during the lectures. Questions will be related to and based on the content of your projects. Thus, the questions will have no universal answers. In some cases, your answers must be tailored to the specifics of your group project. Details of each group project will be considered in marking. If you miss a lecture or a group meeting, it is your responsibility to catch up with the latest developments. Each quiz will take no more than 45 minutes and may contain multiple-choice and/or short/long questions. <u>All quizzes will be given through Gradescope</u>. In-person participation is required to take each of them (you must be physically in the class to take the quiz, unless in case of an emergency, <u>about which the instructor should be notified</u>). All quizzes are open-book and you may use any available resources, online or offline, during the quiz. However, **communication is considered a Scholastic Offence** and students who communicate with each other during a quiz, <u>in any shape or format and by any means</u>, will be referred to the Dean's Office, as per policy.

Practice Studios
To help you apply the concepts and principles and get to reflect on them, you will work in randomly assigned teams to do 5 in-class analysis, design, and evaluation practices. In these studios, you will have to demonstrate a deep understanding of the studied materials when conceptualizing and analyzing issues. For these studios, all members of the team should have kept up with and studied all the readings and lecture notes carefully and be able to participate in group activities.

You will be given one or more problems. As a group, you will create one or more solutions and/or systems. You will do some hand-drawn solutions/designs and generate a set of slides for a presentation at the end of the studio time. This presentation will cover two parts. First, you will present an introduction and analysis of the assigned problem. Second, you will present your solution to the problem. You need to justify your decisions as how and why of your solution during this presentation.

Marks for this component will follow the general marking scheme (see Section 5) and will be based on at least the following criteria:
- Analysis and understanding of the problem
- Incorporation of concepts, principles, and techniques covered in the course
- Fidelity of the solution and/or design
- Quality of the presentation

Project
This component of the course is structured to make you gain experience in designing new HCI systems by applying the theoretical concepts of the course to a concrete problem. In teams of 5 people, you will design and implement a small-scale application. The project will have 6 deliverables:
1. team profile and proposal,
2. design document (storyboard and script),
3. implemented prototype,
4. final report (in a web-based, interactive publication format),
5. peer evaluation, and
6. final class presentation.

Most important about the project is to learn to consciously apply the theoretical concepts and principles of the course in your design.

Project Submissions
For all submissions, <u>except the final report and presentation,</u> use a format that does not require special software (.PDF files are best). The team profile, proposal, and design document will be submitted electronically through the OWL system as .PDF files. You are encouraged to use version controlling services such as GitHub or GitLab for the maintenance of your project's source code. Every effort will be

made to have written submissions marked and handed back within 2 weeks of the hand-in date and will usually be available sooner.

Team Profile and Topic/Application Proposal
This document has two parts: Team Profile and Topic/Application Proposal. In Team Profile, you will identify your team members and provide a brief background for each (e.g., what other courses you have taken, knowledge of tools, frameworks, etc.). In the Proposal, you will identify and describe what you want to design (i.e., topic of your project), and the scope of your project. You need to make sure that your scope is manageable and that your team members have enough expertise to carry it out. This document will be 4 pages long, at maximum.

Design
In the design document, you must come up with a detailed storyboard and script of your interactive system. This part of the project consists of two parts: an executive-level description of the goals of your system and the design. Once you have decided what your design is like, you will develop your storyboards and scripts. These will be detailed drawings and descriptions of how your system will function—all the buttons, icons, transitions, etc. Try and make the storyboard such that they are readable. Your storyboard will be essential for the next phase and will make it easier for you to translate your design into an implemented system. Your preliminary design is the first major step in your project and should be submitted as a single .PDF file through OWL. You will receive initial feedback regarding the complexity and scope of your projects based on this document.

Final Submission
Your final implementation will be assessed based on the final report and final design. All its elements should be clear to the instructor and the TAs. Furthermore, this document should incorporate and reflect all the feedback and concerns on the Preliminary Design, received from the TAs and instructor.

Final Implementation (Prototype)
You will develop a prototype based on what you have described in your Design document. It should be noted that your final design is a, likely modified, version of your preliminary design. This prototype will be a **fully functional** implementation of your design as an interactive system. You can use any tool or programming language you like to implement your prototype. Make sure you DO NOT spend time learning a new language or a tool to implement your design. Use a tool that you know well so that you can concentrate on design rather than implementation issues. You are encouraged to use a version management and collaboration system like GitHub or GitLab. You must include the full code repository, or an address pointing to it, in your final submission.

Presentation
At the end of the term you will give a presentation of your system to the class. The exact duration of this presentation is yet to be determined and announced based on the number of groups, but usually each group is given ~10 minutes. For the benefit of the rest of your classmates, you will describe the evolution of your design: your motivation for choosing the project, your design, your prototype, and all other components. You will do this collectively as a team. There will also be ~5 minutes after your presentation for questions, comments, and class discussion.
There is no specific requirement for the format of the presentation. You are encouraged, and not required, to design your presentations in web-based interactive format, similar to your final report. You will submit a copy of your presentation (.PDF in case of using PowerPoint or any other offline tool, and a link to the presentation in case of designing web-based interactive presentations) through the OWL system. Note: if you are presenting on the first day of Group Presentation days, your project does not have to be necessarily

finalized and submitted (see important dates in Section 3). Also, you can bring snacks to share with others while you are doing your presentations. This is an informal, but structured, presentation.

Final Report (web-based interactive article)

The final report will be an online publication, in the form of an interactive webpage. You are encouraged to use toolkits such as Idyll (https://idyll-lang.org/docs) for direct content rendering to web or libraries such as NextJS (https://nextjs.org) or NuxtJS Content (https://content.nuxtjs.org) for Markdown rendering. Thanks to the detailed documentation available, learning how to write articles with toolkits such as Idyll, and to publish them using platforms like GitHub Pages, is easy and should not be a burden for the students of this course. Please note that designing interactive systems is the goal of this course and as such, your final report **must be** a web-based, interactive article that involves and describes elements of the final system. Also, **no MS Word or PDF documents will be accepted as your final report** (will receive 0 on the Final Report component). You must only submit a link to your interactive article along with your final deliverables.

Your report will consist of the following 5 sections:
1. an executive summary,
2. a navigational map of your system,
3. a list of at least 20 design principles that you have used (with justifications),
4. a final heuristic evaluation of the system,
5. and your thoughtful recommendations for how the system can be improved in the light of your final evaluation.

You will derive a set of evaluation heuristics from the course material and use it to evaluate your system. Make sure that your report and the language you use are based on the concepts and ideas studied in the course. A link to your code repository (either a GitHub/GitLab/… code repository or an uploaded .ZIP archive) should also be contained in this article.

Peer Evaluation

On the last day of classes, you will evaluate your team-mates or peers in terms of how cooperative they were, how much effort they put into the project, whether they attended your meetings, and so on. The project mark of students whose Peer Evaluation is below 70% will be adjusted to reflect their lack of engagement with the group. That is, a member who gets 70% on Peer Evaluation will receive an individually overwritten mark of 70% of the total project mark given to the group. Each student should get at least 50% on this component of the project to pass the course. Please note: Students who fail on their Peer Evaluation will automatically fail the course, unless, based on justifiable reasons provided by the student, the instructor judges otherwise.

Deadlines and Late Submission Penalty

All submissions (project components and reading assignments) are due before the start of each lecture (2:30 PM every Monday). For example: Team Profile & Proposal document should be submitted no later than Jan. 23rd at 2:30 PM; Reading Assignment #1 is due Jan 16th at 2:30 PM; Final Project Submission is due Apr. 3rd at 2:30 PM.

Late submissions will receive a penalty according to the following:

24 hrs: -10%; 48 hrs: -20%; 72 hrs: -30%; 96 hrs: -40%; 96 hrs+: -100%

Individual extensions may be granted only by the course instructor. If you have serious medical or compassionate grounds for an extension, you should follow the procedure for Academic Accommodation as given below.

Technical Requirements

A laptop computer will be necessary to be able to take quizzes, participate in Practice Studios and presentations.

5. Method of Evaluation

This course is based on the experiential model of learning. It has both a theoretical component as well as a practical component. The theoretical component includes online lectures and readings whereby students learn concepts, principles, and techniques. The practical component includes online, in-class practice studios, as well as a term-long project. The project is intended to help students apply the concepts and principles and get to reflect on their own and other people's practice. In this component, students work in teams. Teams get to design mock-up prototypes of different computer interface elements. Assigned readings as well as class lectures provide students with the foundation to work on their projects. Students are expected to study and understand the theoretical principles and concepts carefully. The project, and practice studios provide opportunities to see how theoretical concepts have practical applications. Another component, system presentation, is intended to deepen students' understanding by allowing reflection on systems and tools and how they have been designed.

Structure of Evaluation
The overall course grade, out of 100, will be calculated as following:

Component	Value
5 Practice Studios	20% (group mark: 5×4%)
3 Quizzes	30% (individual mark: 3×10%)
Reading Assignment Summaries	5% (individual mark)
Peer Evaluation	1%
Group Project	44% (group mark)
Group Project - *Team Profile & Topic/Application Proposal*	2/44
Group Project - *Preliminary Design* (creation of a complete storyboard and script of the application)	5/44
Group Project - *Final Design*	5/44
Group Project - *Final Implementation*	12/44
Group Project - *Final Report* (web-based interactive article) - Executive Summary (1%) - Navigational Map (1%) - Employed Design Principles (3%) - Evaluation (3%) - Publication Quality (2%)	10/44
Group Project - *Presentation*	10/44
Best Project	Up to 8% Bonus

Marking scheme for each and every component of the course will be according to a 7-point Likert scale:

1. Extremely good: quality of work is exceptional; demonstrates great depth and breadth of understanding; there are absolutely no flaws in the work; beyond the call of duty. 100%

2. Very good: quality of work is very good; almost no flaws; demonstrates very good understanding. 90%

3. Good: quality of work is good; there are some aspects of the work which can improve. 80%

4. Acceptable: quality of work is acceptable or fair; not much thought has been put into some parts.	70%
5. Poor: quality of work is not acceptable; poorly based on any materials studied in the course.	60%
6. Very poor: component is very poorly done; many flaws; not based on materials studied in the course.	50%
7. Not delivered: component not completed.	0%

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

For any absences, <u>regardless of the component's worth</u>, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

7. Accommodation and Accessibility

Religious Accommodation
When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

https://multiculturalcalendar.com/ecal/index.php?s=c-univwo.

Accommodation Policies
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf.

8. Academic Policies

The website for Registrar Services is http://www.registrar.uwo.ca.
In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.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).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/.

Students who are in emotional/mental distress should refer to Mental Health@Western (https://uwo.ca/health/) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (https://learning.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.