

CS4474/CS9552: Human-Computer Interaction

Lecture and Instructor Information

Time	Room	Instructor	Office	Email
Mon 2:30–5:30 pm	TC-203	Dr. Kamran Sedig	MC 420	sedig@uwo.ca

Course Description

This course provides an overview of a number of areas in human-computer interaction (HCI). Broadly speaking, HCI is an interdisciplinary area concerned with the design, evaluation, and implementation of interactive systems for human use and with the study of major phenomena surrounding them. HCI addresses any interaction with computers by humans, as developers or as users, as individuals or as groups. On completion of the course, students are expected to have theoretical knowledge of and practical experience in the fundamental aspects of designing, implementing, and evaluating interactive systems that are useful and usable. Design of usable technology draws extensively on knowledge of informatics, cognition, communication, and computation. 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.

This course consists of lectures, in-class design studio work, reading assignments, presentations, a team-based project, and a final exam.

Graduate students from LIS and HIS are encouraged to take this course. They may opt out of the final and write a research paper.

Course Structure

This course is based on the experiential learning model. It will have both a theoretical component as well as a practical component. The theoretical component will include lectures and readings in which students learn HCI concepts and principles. The practical component will include in-class design practices and a term-long project through which students apply the concepts and principles and get to reflect on their own and other people's practice. In the practical component, students will work in teams. Teams will get to conceive, design, prototype, and evaluate interactive software systems. Assigned readings as well as class lectures will provide students with the foundation to work on their designs and projects. Students are expected to study and understand the theoretical principles and concepts carefully. The project and design studios provide opportunities to see how theoretical concepts have practical applications.

Required Course Materials

There are **two required books** that every student in the course must study.

CAT: Laurel, B (2013, 2nd Ed.). *Computers as Theatre*. Addison Wesley. (available through Amazon.ca)

UPD: Lidwell, W., Holden, K., & Butler, J. (2010). *Universal Principles of Design: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design*. (available through Amazon.ca) – See end of this document for chapters for which you are responsible.

Copies of the lecture notes will be made available for students through OWL.

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

Course Prerequisites

Students enrolled in this course are likely final-year undergraduate or first-year graduate students. They are expected to have a strong understanding of programming and development tools. Having taken courses in cognitive science or psychology of thinking can be helpful for this course, but not necessary. *Since this is an interdisciplinary course, students from other departments who do not have knowledge of programming are permitted to take this course, particularly graduate students in Library and Information Science, Media Studies, or Health Information Science. They will work in teams whose members have programming expertise.*

Course Website

Students should check OWL (<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, and by which assignments will be submitted. Students are responsible for checking OWL on a regular basis.

Course Evaluation

The overall course grade, out of 100, will be calculated as listed below.

Component	Value
8 Design Studio activities -- 6 out of 8	24% (group mark – 6 * 4%)
Reading Assignments	9% (individual mark)
Final Exam	30% (individual mark)
Group Project	37% (group mark) [+ 3% for best project]
<i>Team profile & Application/topic proposal</i>	1%
<i>Design (creation of complete storyboard and script of the application)</i>	4%
<i>Degree of design complexity of app (how complex app is, how design principles are interwoven together, number of principles used [20+ principles], etc.)</i>	10%
<i>Full error-free implementation</i>	15%
<i>Final report (including evaluation)</i>	
<i>Executive summary</i>	(1%)
<i>Navigation map of app</i>	(1%)
<i>List of 20+ design principles used in the app, with reference, & their location in the app</i>	5%
<i>Evaluation of app</i>	(1%)
	(2%)
<i>Informal Presentation</i>	2%
<i>Peer Evaluation</i>	0%
<i>Best Project (Bonus mark)</i>	3%

Marking scheme for each and every component and element of the course

Your mark will be based on a Likert scale, as follows:

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|--|------|
| 1.Extremely good: quality of work is exceptional; there are absolutely no flaws in the work. | 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% |

Some Lecture Topics

Although this course will cover many topics, some of those that will be discussed include the following:

- Framework for designing interactive systems
- Human-centered interactive systems design
- Usability and evaluations
- Principles of design
- Metaphors in design
- Conceptual models

Readings (R)

It is **imperative that you keep up with the assigned readings**. A good understanding of the material from the readings is essential if you want to do well on your projects and in the course. This course requires you to comprehend the readings and be able to apply them intelligently to your designs. To help you keep up with the reading material, you are required to **submit a summary of the assigned readings every week**, starting from the second week (**14th of January**). In the course schedule, your assigned readings are put in parenthesis (e.g., UPD Part 1) (see **Course Schedule**). The main purpose of these readings is to help you keep up with the course, and be ready for design studios, the project, and the final exam. 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.

Summary Format and Content

The summary should **highlight and present the main issues or concepts** discussed in the readings, and it should be based on *your own* reading of the text. *A summary that is merely a copy of material from the textbook will be assigned a mark of zero.* The length of the summaries is not important; what matters is that you have expressed the content in your own words. Your summaries should include a cover sheet with your name, the textbook name and chapter number(s), course number, and date. Summaries should be submitted electronically through OWL **before 2:00 PM** of the day on which they are due **in their respective assignment submission portal. Late submissions will not be accepted.** The summaries are to be single-spaced, no less than 1 full page, and in an 11-point font of Times New Roman. File name should have the following format: Reading#_HCI_LastName_FirstName (e.g., #1_HCI_Smith_Joe). If this file format is not followed, your assignment will be discarded.

Design Studios (DS)

To help apply the concepts and principles and get to reflect on design principles and techniques, you will work in small teams to do 8 in-class design practices (see **Course Schedule**). Your mark for this component is based on the best 6 out of these 8 design studios. In case of illness, you may miss 1 or 2 of the 8. In these studios, you will have to demonstrate a deep understanding of the studied materials when conceptualizing and analyzing design scenarios. For these studios, all members of the team should have studied the readings carefully and be able to participate in group activities.

For this component, you will work in a randomly assigned group. You will be given a design topic. As a group, you will research that topic with the assistance of the course readings, lecture notes, textbook(s), and the Internet. You will generate a set of slides for a presentation to occur at the end of the lecture time using PowerPoint or equivalent presentation software. This presentation will cover two parts: First, you will present an analysis of the assigned design topic using notable software examples (websites, applications, etc.). They will be used to assist in educating the audience on how the design topic is involved (and not involved) in the design of those software examples. Secondly, you will present a fast prototype which provides a re-design of one of the presented software examples which did not correctly support the considerations of the design topic. Your decisions as how to apply and implement these considerations to support the tasks is based on your understanding of the topic, which you need to justify during the presentation. Make sure to have computers that have display (VGA) ports or bring an adapter.

Final Exam

Final exam questions will be drawn from **all of the following**: lecture notes, assigned readings, discussions from class, and any notes written on the board during lectures. **If you miss a lecture it is your responsibility to find out what was covered.** No electronic devices may be in your possession during the exam.

The final exam will contain multiple-choice and/or short questions.

It is Faculty of Science policy that a student who chooses to write an exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress *after the fact* will not be considered.

Email Policy

All course-related emails should come from OWL. No emails from other accounts will be read or accepted. Also, any email you send should have a proper subject line (e.g., **Project Proposal**). Make sure to check-mark the "Send a copy of this message to recipients' email address(es)" when you send an email to either the professor or the teaching assistant. Generally, emails will be answered within 5 days, depending on the volume of emails I have received during that week. Please **do not expect replies to emails during weekends.**

Occasionally, it may be necessary to email the whole class, or students individually. Email will be sent from OWL to your UWO email address. You must make sure that you read your email on a frequent and regular basis, or have it forwarded to an alternative email address if you prefer to read it there. However, remember that your UWO email may have quotas or limits on the amount of space available. If you let your email accumulate there, your mailbox may fill up and you may lose important email from your instructors. Losing email that you have forwarded to an alternative email address is not an excuse for not knowing about the information that was sent.

Assignment Submissions

Each submission should include a cover sheet which includes: heading (e.g., Project Proposal), title (e.g., name of your project), course number, date, and **alphabetical** list of names (Last, First) of all students in the team. Make sure you do NOT include your ID numbers. All submissions are also to include a blank page for your mark. You will submit all your assignments in an electronic form through the OWL system and will receive them back through the OWL system. The file names should follow the general protocol below: <SUBMISSION_HCI_Group#> (e.g., ProjectProposal_HCI_Group#3).

Project

In teams of 5 people (depending on the number of registered students), 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, 5) peer evaluation, and 6) final class presentation. **The most important thing about the project is for you to learn to consciously apply the theoretical concepts and principles of the course in your design.**

Teams

Teams will be created in the first two weeks of the course. Each team will be assigned a number. Once project teams are formed, there will be no movement of students from one team to another. If a student drops the course, that student's team will continue to exist, minus one member. In this event, the other members should talk to the instructor if they think they need to re-adjust the scope of their project. Final project presentations are according to team numbers. That is, Team 1 will present first, Team 2 will present next, and so on.

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 80%** will be adjusted to reflect their lack of participation in the project. That is, someone who gets 70% on peer evaluation will receive 70% of the total project mark for 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. Each student will upload a peer evaluation form in their OWL dropbox. This form will contain the name of your teammates, excluding yourself, and a score ranging from 0 to 100% for each peer. The file will have the following name: ProjectPeer_Team#_LastName_FirstName. If this naming format is not followed, your file will be discarded.

Project Submissions

For your submissions, use a format that does not require special software (e.g., .docx, .ppt, .jpg). The team profile, proposal, design document, final report, and presentation will be submitted electronically through the OWL system. The prototype will be submitted on CD, DVD, USB drive, SD card, or any other means that you have cleared with the instructor ahead of time. This submission includes the executable and any related source files (e.g., source code, project files, images, etc.).

Ideally, your prototype should run on a Chrome web page. 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 Application Proposal

This document has two parts: Team Profile and Application Proposal. In the team profile, you will identify your team members and provide a brief background of them (e.g., what other courses they have taken, knowledge of tools, 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 will be a maximum of 4 pages long. Only one person from your group will upload this file. The file will have the following name: ProjectProposal_Team#. If this naming format is not followed, your file will be discarded.

Design

In the design document, you have to 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 I will be able to easily understand it. 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 design should be submitted as a file through OWL. The file will have the following name: ProjectDesign_Team#. If this naming format is not followed, your file will be discarded.

Prototype

The prototype will be a **fully-functional implementation** of your design as an interactive system. Your prototype will be based on your design. 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.

Final Report

The final report will consist of the following 5 sections: an executive summary, a navigational map of your system, and a list of at least 20 design principles that you have used (with justifications), a final heuristic evaluation of the system, 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.* The file will have the following name: ProjectReport_Team#. If this naming format is not followed, your file will be discarded.

Presentation

At the end of the term you will give a class presentation of your system. This presentation will be 30 minutes long, depending on the number of teams. 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 so on. You will do this collectively as a team. There will also be 10-15 minutes after your presentation for questions, comments, and class discussion. You will submit a copy of your presentation in electronic form through the OWL system. The file will have the following name: ProjectPresentation_Team#. If this naming format is not followed, your file will be discarded. **Note:** Your prototype does not need to be complete by the time of the presentation (see Important Dates below). If you want, your final report can be based on the state of the prototype at the time of the presentation to reduce the amount of work that you need to do. Also, you can bring snacks to share with others while you are doing your presentations. This is an informal presentation.

Policy for late delivery of project components:

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

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 for Medical Illness as given below.

Course Schedule

Date	Your Task
Jan. 7	First lecture
Jan. 14	DS#1; (R#1: UPD Part 1)
Jan. 21	DS#2; (R#2: UPD Part 2); Project team profiles & proposals due
Jan. 28	DS#3; (R#3: UPD Part 3)
Feb. 4	DS#4; (R#4: CAT Chap 1)
Feb. 11	(R#5: CAT Chap 2); Mid-point project design presentations and submissions
Feb. 18	Reading week
Feb. 25	DS#5; (R#6: CAT Chap 3)
Mar. 4	DS#6; (R#7: CAT Chap 4)
Mar. 11	DS#7; (R#8: CAT Chap 5)
Mar. 18	DS#8; (R#9: CAT Chap 6)
Mar. 25	Course Overview + Q&A
Apr. 1	Project presentations
Apr. 8	Project presentations + Final prototypes & reports due

Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html>, 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 his/her official university address is attended to in a timely manner.

Also note that electronic devices will not be permitted on tests and exams.

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_grad.pdf

Support Services

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.

University Students' Council: <http://westernusc.ca/services/>

Accessibility

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

Missed Course Components

If you are unable to meet a course requirement due to illness or other serious circumstances (including work that is worth less than 10% of the total course grade), you must provide valid medical or supporting documentation to the Academic

Counselling Office of your home faculty as soon as possible *and* contact your instructor. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. Such arrangements are likely to include time extension or reweighting of the Final Exam mark depending on when the assigned work was due.

If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in WSC 140, and can be contacted at 519-661-3040 or scibmsac@uwo.ca. Their website is http://www.uwo.ca/sci/undergrad/academic_counselling/index.html

A student requiring academic accommodation due to illness must use the Student Medical Certificate (http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf) when visiting an off-campus medical facility.

For further information, please consult the university's medical illness policy at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

There will be **no makeup quizzes**. If you are going to miss an exam you must have notified the course instructor and filed documentation with your faculty's Academic Counselling Office at least 2 weeks prior to the exam. If you miss the midterm exam for a medical or other valid reason, and present valid documentation to your faculty's Academic Counselling Office, your other quiz marks will be reweighted to include the weight of the missed quiz. You must notify the course instructor within a week of the missed quiz.

Chapters from UDP for which you are responsible:

Part 1

How can I influence the way a design is perceived?

- 22 Affordance
- 24 Alignment
- ████████████████████
- 44 Closure
- 48 Color
- 50 Common Fate
- 56 Consistency
- 58 Constancy
- ████████████████████
- ████████████████████
- 96 Figure-Ground Relationship
- 100 Five Hat Racks
- 116 Good Continuation
- 118 Gutenberg Diagram
- 126 Highlighting
- ████████████████████
- 132 Iconic Representation
- 136 Inattentional Blindness
- 138 Interference Effects
- ████████████████████
- 146 Layering
- 148 Legibility
- 152 Mapping
- ████████████████████
- ████████████████████
- 196 Proximity
- ████████████████████
- 224 Signal-to-Noise Ratio
- ████████████████████
- ████████████████████
- 240 Top-Down Lighting Bias
- 246 Uniform Connectedness
- 250 Visibility
- ████████████████████

Part 2

How can I help people learn from a design?

- 16 Accessibility
- 18 Advance Organizer
- ████████████████████
- ████████████████████
- 40 Chunking
- 42 Classical Conditioning
- 52 Comparison
- 72 Depth of Processing
- ████████████████████
- 104 Forgiveness
- 112 Garbage In–Garbage Out
- 122 Hierarchy
- 134 Immersion
- 138 Interference Effects
- ████████████████████
- 146 Layering
- 148 Legibility
- 154 Mental Model
- 158 Mnemonic Device
- 174 Operant Conditioning
- 178 Performance Load
- 184 Picture Superiority Effect
- 188 Progressive Disclosure
- 198 Readability
- 200 Recognition Over Recall
- ████████████████████
- 220 Serial Position Effects
- ████████████████████
- 224 Signal-to-Noise Ratio
- ████████████████████
- ████████████████████
- ████████████████████

Part 3

How can I enhance the usability of a design?

- 14 80/20 Rule
- 16 Accessibility
- 20 Aesthetic-Usability Effect
- 22 Affordance
- 54 Confirmation
- 56 Consistency
- 60 Constraint
- 64 Control
- 68 Cost-Benefit
- ████████████████████
- 80 Entry Point
- 82 Errors
- 98 Fitts' Law
- 104 Forgiveness
- ████████████████████
- 120 Hick's Law
- 122 Hierarchy
- 132 Iconic Representation
- 134 Immersion
- 138 Interference Effects
- ████████████████████
- 146 Layering
- 152 Mapping
- 154 Mental Model
- 156 Mimicry
- ████████████████████
- 178 Performance Load
- 182 Personas
- 188 Progressive Disclosure
- 198 Readability
- 200 Recognition Over Recall
- 224 Signal-to-Noise Ratio
- 250 Visibility
- 260 Wayfinding