CS/SE 4HC3 – Human-Computer Interfaces

McMaster University
Department of Computing and Software

Fall 2018 Course Outline

Course Title:	COMP SCI / SFWR ENG 4HC3: Human-Computer Interfaces
Term:	Fall 2018 (September - December)
Term dates:	September 4th – December 5th, 2018
Lecture Times:	MWTh 4:30-5:20
Lecture Location:	
Midterm Recess:	October 8 – October 14
Last Day to Cancel course:	November 9th, 2018
Midterm Exam:	Last week of October/First week of November
Final Exam Period:	December 7th – December 20th, 2018
Instructor:	Adam J. Lenarcic (`lenarcaj`)
Office Hours:	To Be Determined & upon Request
Office:	N/A
TAs:	Adam Lenarcic (`lenarcaj`) Geneva Smith (`smithgm`) Alison Bayzat (`bayzatam`)
Website:	Hosted on Avenue to Learn

Calendar Description:
Design of user interfaces. Principles of good interface design. Human input. Displaying complex data using graphics and virtual reality. Modes and mode awareness problem. Health issues, information overload. Special purpose graphics hardware. Interface design tools; on-line help systems.

Course Description:
This course is an introduction to human-computer interaction (HCI). It covers various topics that fall under the broad area of HCI, starting with user interface design principles, and including empirical methods for evaluating human computer interfaces.
This is predominantly ***not*** a programming course; while assignments and projects may include programming components, students are free to use any language/API of their choice as appropriate. The usability is marked, not the source code. To this end, programming topics are *not* included as course material.

Learning Objectives:
By the end of this course students should be able to:

- Understand basic UI design principles
- Critique existing user interfaces, identifying both good and bad design elements
- Understand the predominant interaction paradigms
- Understand key models of human performance and perception with respect to HCI
- Conduct empirical evaluations by experimental comparison of different interface design options

Required Text Book:

- Human-Computer Interaction: An Empirical Research Perspective, I. Scott MacKenzie, Morgan Kaufmann 2013. ISBN: 978-0124058651.
- The Design of Everyday Things:Revised and Expanded Edition, Don Norman, Basic Books 2013. ISBN: 978-0465050659. (Note: Older versions use slightly different principles, so ensure you are using the correct ones for your assignments.)

Other Recommended Text Books/Resources:

- The Inmates are Running the Asylum, Alan Cooper, Sams Publishing 2004. ISBN: 978-0672326141
- Selected readings from websites and the ACM Digital Library (e.g., proceedings of the ACM Conference on Human Factors in Computing Systems).

Course Evaluation:

Tutorial Participation	10%
Assignment 1: UI Critique	10%
Assignment 2: UI Design	15%
Midterm Exam:	15%
Final Project:	35%
Final Exam:	15%

Minimum 30% on final exam required for course credit.
+1 bonus to final unrounded grade if no MSAF used.

Assignment Policies:

- There may be both written assignments and programming assignments in this course.
- Assignment #2 will be completed in groups. In most cases this will be the same group as for your project. You may select a different group but you must inform the instructor prior to beginning. (Note that special permission from the instructor is required to work alone.)
- Programming assignments will involve designing and implementing a user interface for a specified task. You may use any programming language or software development framework you like for this, but higher level frameworks (e.g., Visual Basic/C# .Net) are recommended as they will save you time in prototyping. Conversely, picking a language like C will likely bog you down in details – note that *no additional credit* will be awarded for intentionally picking a difficult programming platform!
- Note that programming assignments will be graded based on creativity/novelty, adherence to good UI principles and above all, effectiveness of your solution from a design perspective.
- Programming assignments must include documentation to help the TA run your program. At minimum, you should include a Windows executable. Assignments that do not run will not be marked and will receive a grade of zero. Remark requests in these cases will be ignored.
- Written assignments will be graded not only according to how well they address the topic at hand, but also according to how well written/legible they are. To this end, spelling, grammar, clarity of argumentation, correct use and appropriateness of references, and so on, will all be considered in grading.
- Late assignments will be penalized 20% per day. Assignments will be due in class, or in tutorial.
- Plagiarism detection software (e.g., MOSS, Turnitin) may be used on assignments. Any instances of copying will be dealt with harshly (see below).
- All assignment remark requests must be submitted in writing within one week of the assignment grade being available. Requests made after this period may not be accepted. Remark requests should clearly indicate where and why you feel your work deserves a higher grade. Simply indicating dissatisfaction with the current assignment grade will be ignored.

Assignment Schedule (tentative):
Assignment 1: Early/Mid October
Assignment 2: Early November

Tutorials:
Tutorials involve TA-led exercises. Some of these will be structured like a seminar, i.e., you will discuss readings provided in class. Others will involve completing a short assignment. For example, you might make a paper mockup of a UI for a specific task, conduct brainstorming exercises, or critique usability issues on a website or digital artefact. There are 10 tutorials weighted at 1% each. You will be required to both sign in and out to get the grade for a given tutorial. Note: Grad students (6HC3) are not graded on tutorials, but are expected to attend anyway!

Tests/Exams:
1. The midterm exam will be held during class time.
2. All test remark requests must be made in writing within one week of the grade being available.

Projects:
There are two project options, a *Research Project*, or a *Design Project*. While there are some similarities between these, ultimately, the Research Project is more about conducting (in a group of 2-3) an investigation on a topic relating to how humans use technology, culminating in a controlled experiment with human participants. The Design Project is more about developing a novel UI to accomplish some task. This involves studying existing solutions, then designing and implementing a UI for a software prototype, which you will then informally evaluate with a small number of users. Details on each project type are outlined below. Note: Once your group picks a project type, it will be difficult to change your choice – so choose carefully! Both types of projects involve a multi-step process, with several milestones which will be incorporated into your final report. Milestone descriptions for each project type follow:

Research Project (Teams of 2-3)
1. Proposal and Literature Review: The proposal involves a brief write-up of your research questions and goals of your project, identification of your chosen topic, etc. The literature review involves a review of relevant academic research papers to inform your choice of project, and summarize current research in the area.
2. Methodology Write-up and Research Ethics Application: A write-up of your project's participant selection criteria, apparatus, procedure and experimental design. This will also likely include any hypotheses, and even preliminary results (if you have any at this point).This also requires submission of a human participant research ethics application (this part is *required* before you can continue your project!!). Further details of this can be found at https://reo.mcmaster.ca/
3. Application development (optional): Development of software (or identification/modification of existing software) to use for your experiment. There is no "deadline" on this, but it must be finished before you start the experiment (Milestone #4). Note that you may be able to avoid software development by using existing code.
4. Experiment: Actually conducting an experiment with human participants (likely other students in the class, friends, family members, etc.). No real deadline, but *must* be complete before you can write the results portion of your report (the final milestone, below).
5. Final Report: A report on the project bringing together all the above parts, with the addition of the results and discussion of the results. You will re-use the previously written parts (e.g., the literature review, methodology, etc.) but will expand on these for the final version based on the feedback you get through the course. For example, participant demographic data will be included in the final methodology section. The report will be formatted using the ACM CHI submission guidelines.

Design Project (Teams of 3-4)

1. Proposal and Software Survey/Critique: The proposal involves a brief writeup of the goals of the type of software UI you plan to design, and the goals of your project. The software survey/critique component involves identifying several existing software solutions that are similar to your proposed area & analyzing aspects of their UI (i.e., so you can improve on them!)
2. Design Plan and First Prototype: Creation of personas, design mock-ups, and task analysis. All of this will lead up to implementation of your design mock-ups as (semi-)functional software. Note that the UI should be minimally functional – e.g. pressing buttons should change/pop-up screens, but the actual functionality of the software is left to the users imagination. The purpose is that the flow of your software can be demonstrated.
3. UI Evaluation: Having several people (e.g. other students in the class, friends, family members, etc.) actually use your software, to help you identify potential issues.
4. Final Prototype & Report: Using the feedback garnered from your UI Evaluation, refine your design further, and enhance the functionality of your software. This will be accompanied with a short report identifying the outcomes of the evaluation, what changed from the earlier prototype, and why (e.g. due to feedback from the evaluators).

For undergraduate students: all members of a team will receive the same grade on the project.
Grad students (6HC3) are expected to do a Research Project and will work alone. They will also present their project topic in class. This will involve an approximately half hour presentation in the second last week of class. *These presentations are examinable for the final exam!* Details will follow later.

Project Milestone Schedule (tentative):

Milestone	Research Project	Design Project	Weight	Due
1	Proposal & Group Formation	Proposal & Group Formation	3%	10/01/18
2	Lit Review	Software Survey/Critique	6%	Mid Oct.
3	Method & Ethics Protocol	Design & First Prototype	9%	Early Nov.
4	Experiment & Final Report	Final Prototype & Evaluation Report	17%	Dec 4th
Total:			35%	

Sample project topics will be provided later. If you have an idea, but aren't sure about it, come see me! By appointment, I can show examples of projects from last year. (Contact me in advance)

Missed Work:

Accommodations for missed work (both assignments and exams) will be made in accordance with McMaster University policy. In particular, the instructor reserves the right to conduct any deferred tests orally.

Course Modification:

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.
At certain points in the course it may make good sense to modify the schedule. The instructor may modify elements of the course and will notify students accordingly (in class, on avenue)

Contact:

All course contact will be through Avenue to Learn and/or your McMaster student email. You can typically expect email replies from me within 48 hours (usually less), unless your question is already answered by available course documents (e.g., syllabus, assignment description, etc.).

In this course we will be using Avenue to Learn. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Academic Integrity:

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage, or willingly assist another student in doing so. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity
The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g., the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work if not expressly allowed.
3. Copying or using unauthorized aids in tests and examinations.

Discrimination:

The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination.
If there is a problem that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Office or the Human Rights Consultant, as soon as possible.

Students with Disabilities:

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study.

Lecture Schedule:

Week	Topic	Readings	Work Due
Sept4 – 7	History of HCI	MacKenzie – Chapter 1	
Sept 10 – 14	The Human Factor: sensors, responders, cognition, memory	MacKenzie – Chapter 2	
Sept 17 – 21	Everyday things, HCD, Seven stages of action & the three levels of processing	Norman – Chapter 1/2	Tutorial #1
Sept 24 – 28	Natural mapping, memory	Norman – Chapter 3	Tutorial #2
Oct 1 – 5	Interaction Elements, modes, mappings, spatial relationships, errors	MacKenzie – Chapter 3	Assignment #1 Tutorial #3
Oct 8 – 12	Mid-term Recess. No Lectures.		
Oct 15 – 19	Visibility, Feedback, errors	Norman – Chapter 4/5	Tutorial #4
Oct 22 – 26	Task Analysis, GOMS, Personas	TBA	Tutorial #5
Oct 29 – Nov 2	Q & A; Open Lecture		Tutorial #6
Nov 5 – 9	Designing HCI Experiments, Performing Experiments	MacKenzie – Chapter 4/5	Assignment #2 Tutorial #7
Nov 12 – 16	Hypothesis Testing, Modeling Interaction	MacKenzie – Chapter 6/7	Tutorial #8
Nov 19 – 23	Invited Talks/Guest lectures	TBA	Tutorial #9
Nov 26–Nov 30	Summary, overview, conclusions		Tutorial #10
Dec 3 – Dec 4	Q & A		