Human-Computer Interaction

CSCI 4620U / CSCI 4620G / SOFE 4850U
Fall 2014 Course Outline

UNIVERSITY OF ONTARIO INSTITUTE OF TECHNOLOGY

Professor

Dr. Christopher Collins
UA 4024, 905-721-8668 ex. 6581
Please contact me through Blackboard; urgent emails only to christopher.collins@uoit.ca

Teaching Assistant

Hrim Mehta
Contact through Blackboard; office hours 11:00am-12:00pm, UA 4029

Schedule

Lectures	**Labs / Tutorials**
Tuesday 8:10-9:40pm, UL 11	Tuesday 2:10-4:00, J 123-A
Friday 9:40-11:00, UL 11	Or Friday 1:10-3:00, J 123-A
	No labs on the weeks of Sept 8-12, Oct 6-10, Dec 1-5

Important Dates

Classes start: September 4, 2014
Last day to register: September 17, 2014
Last day to withdraw from course without note on transcript: October 1, 2014
Midterm test: October 17, 2014
Last day to withdraw from course: November 11, 2014
Classes end: December 3, 2014
Final exam period: December 5-17, 2014

Other important dates: www.uoit.ca > current students > Important Dates

Due to research-related travel, class may be offered through a video lecture or guest lecture on Oct 7 and Nov 7, 11, and 14. Please watch Blackboard for announcements.

Instructor Contact Hours – Office UA 4024 & Online

Tuesday 10:00am-11:00am or by appointment. I can also be available by Blackboard Chat by appointment.

Calendar Entries

CSCI 4620: This course provides an introduction to human-computer interaction (HCI), with emphasis placed on understanding human behaviour with interactive objects, general knowledge of HCI design issues, and a human-centred approach to software design. The course will stress the design of usable interfaces, including the consideration of cognitive factors and social contexts within which computer systems are used. Students will receive an introduction to HCI while applying this theory to a design project.

SOFE 4850: Principles of human interaction with computers, graphical user interfaces (Windows, Unix), concrete designs and good design principles. Rapid prototyping, evaluation methods for user interfaces, cognitive psychology. Ergonomics, principles of computer graphics, voice recognition, remote instrumentation, immersive environments, virtual reality, and augmented reality.

Extended Course Description

This course is about the *human* side of computing: human-computer interaction. The focus of the course is on the design and evaluation of usable and useful interactive computational interfaces which enhance and support the cognitive, communicative, and creative capacities of people. The course introduces research methods used to gain holistic and in-depth knowledge about tasks, mental models, and contexts, in order to design interfaces which are responsive and supportive. The course will discuss the economic, safety, and productivity consequences of poorly designed interaction techniques and interfaces. Building on design thinking developed through case studies and critique exercises, the course will also introduce several interface implementation technologies and standards, across a variety of computing modalities and contexts, including desktop, web, mobile, gesture, virtual reality, and multi-touch hardware.

Basic knowledge of HTML and Java is assumed. Classes will consist of lectures based on the course readings, relevant videos, and discussions of late-breaking research. Lab sessions will review the data gathering methods, programming techniques, experimental methodologies, and algorithms needed to complete the assignments, as well as allow students time to work with specialized hardware required for some assignments.

Students are encouraged to take their own notes and to conduct online discussions to supplement the instructor's material.

Learning Outcomes

On the successful completion of CSCI 4620 / SOFE 4850, students will be able to:

1. Describe a typical process used to understand people and contexts, enumerate tasks and requirements, and to evaluate the success of implemented interfaces.
2. Critique interactive interface design using well-founded theoretical explanations.
3. Recognize the impact of human-computer interaction in everyday life situations.
4. Implement universal design techniques and apply standards for universal accessibility.
5. Apply principles of good interface design in the creation of small scale systems.
6. Work in small teams on a multi-step project.
7. Write and speak clearly about issues and challenges in hardware and software interface design, specific challenges uncovered during their term project.
8. Apply general mathematical models in the assessment of interaction technique efficiency and effectiveness.

Course Design

Instruction for CSCI 4620 / SOFE 4850 will be conducted in person and through Blackboard. Lecture materials, supplemental readings and software required for the course will be provided as needed through Blackboard links. Lab/tutorial activities will supplement the lecture material. Students are advised to check Blackboard regularly. Regular attendance is important for a successful course, and participation marks will be allocated based on attendance and active participation in class discussions in person and online.

We will use Blackboard for class discussions, in particular, for sharing examples of well-designed interfaces, critiques of poorly-designed examples, and news/blog articles pertaining to the course material. Please post your links and participate regularly in the discussion. Students are also invited to take advantage of *Twitter* to ask questions and share links related to course material. Please use the Twitter tag #csci4620. You can follow the professor @ChrisNF.

This term the course term project will be focused on multi-touch computing. Students enrolled in the course will create new interface prototypes for the tabletop or wall display multi-touch hardware using the "Simple Multitouch" toolkit (collaboratively developed by UOIT and U Waterloo). Access to the hardware will be provided in J 123-A for several hours a week. A schedule of open hours for J 123-A will be provided later in the term. Supervised access to additional multitouch hardware, in a research lab, can be arranged as needed.

Course Policies

Class attendance and participation in lectures is strongly recommended. We will discuss *lecture norms* in class and decide on a suitable set for the course, which will be posted to Blackboard. All important new information, such as course news, notes, additional reading, etc. will be available on the Blackboard course page. It is your responsibility as a student to check the Blackboard page for new information. Although I will regularly monitor Blackboard's discussion board messages, these messages are not considered official communication between students and instructor.

Attendance in labs (tutorials) is required. If you miss a lab due to illness or a death in the family, you must obtain the appropriate documentation (UOIT Medical Certificate, death certificate) and submit it to the course instructor within five business days of missing the lab. As space allows, and with a legitimate reason, it may be possible to attend a different lab section or complete a lab on your own time. Contact your TA in advance for approval. Absence from more than two labs, regardless of any documented reasons, will result in a grade of F for the course (see http://www.science.uoit.ca/undergraduate/current-students/academic-policies.php).

If a holy day will conflict with scheduled labs, assignment deadlines, or the midterm test, you must inform the professor or TA at least seven business days before the scheduled time of the lab, assignment, or test.

The instructor and TA will endeavour to provide timely responses to questions and be available during posted hours. However, students should not rely on a reply faster than one working day (i.e. questions sent two hours before assignment deadlines will likely not be answered). Please practice professional communication norms in correspondence with the professor and TA.

This course is governed by the Faculty of Science academic policies (http://www.science.uoit.ca/undergraduate/current-students/academic-policies.php).

Course Calendar (may change – official dates will be on assignment handouts)

Wednesday, Sept 10	Term project part 1a due (participation)
Thursday, Sept 18	Term project part 1b due (1% for submitting; must submit and receive approval before proceeding)
Friday, Oct 3	Term project part 2a due (5%)
Friday, Oct 17	**Midterm test (20%)**
Sunday, Oct 19	Term project part 2b due (9%)
Thursday, Oct 30	Term project part 3a due (7%)
Sunday, Nov 23	Term Project part 3b due (13%)
Friday, Nov 28	Term project part 4a presentations (3%)
Wednesday, Dec 3	Term project part 4b due (7%)

Outline of Topics (subject to changes)

1. Introduction
    a. Understanding humans & computers
2. Special Topics
    a. Multi-touch interfaces
    b. Emerging technologies: gesture, virtual reality, pressure, motion
3. Models & Paradigms
    a. Interaction models
    b. Cognitive models
4. Developing a Rich Understanding
    a. Task analysis
    b. Questionnaires and interviews
    c. Prototyping
    d. Iterative design
    e. Alternative design processes (participatory design, etc.)
5. Evaluation
    a. Usability testing
    b. Controlled experiments
6. Implementation
    a. Java & Processing
    b. Web
7. Special Topics (a selection of these, based on student interest)
    a. Ergonomics
    b. Mobile Devices
    c. Accessibility
    d. Ubiquitous computing
    e. Groupware
    f. Security and usability

Required Texts / Readings

Course Text

David Benyon. Designing Interactive Systems, 3rd Edition (Pearson Education, 2013).

This book is the primary text for the course material presented in the lectures and is available at the bookstore and online at mypearsonstore.ca

Reference Texts

Mackenzie, I. Scott. Human-Computer Interaction: An Empirical Research Perspective, 1st ed. (Morgan Kauffman, 2013). *Online @ UOIT Library*

Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale. Human-Computer Interaction, 3rd ed. (Pearson Education, 2004). *(Available for short term loan from Professor Collins.)*

Readings

Required readings will be posted on Blackboard under "Readings" on a regular basis, as well as announced in class. Students are responsible to know the content in required readings and arrive in class prepared to discuss the assigned readings for the week.

Evaluation – Undergraduate Students (CSCI 4620U & SOFE 4850U)

Student progress in the course will be evaluated through participation, a mid-term test, a final exam, and a term group project. The marking breakdown is:

Participation	3%	*Individual portion**
Labs	10 X 1% = 10%	
Mid-term test	20%	
Final exam	22%	
Group project	45%	
Total	***100%***	

**** You must pass the individual portion of the course to pass the class!***

Final course grades may be adjusted to conform to Faculty grade distribution profiles. Further information regarding grading can be found in Section 5 of the UOIT Academic Calendar.

Lower bounds on letter grade ranges will be treated as strict minimum cutoffs for that grade (grades will not be rounded up).

Evaluation – Graduate Students (CSCI 4620G)

Graduate student evaluation will additionally include 2 individual assignments in addition to a mid-term exam, final exam, participation, and a term group project. The marking breakdown is:

Participation	3%	*Individual portion**
Labs	10 X 1% = 10%	
Mid-term test	10%	
Individual Assignments	2 x 10% = 20%	
Final exam	12%	
Group project	45%	
Total	100%	

**** You must pass the individual portions of the course to pass the class!***

Final course grades may be adjusted to conform to Faculty grade distribution profiles. Further information regarding grading can be found in Section 4.5 of the UOIT Graduate Academic Calendar.

Note that a minimum grade of B- is required for clear academic standing in graduate studies. (see graduate calendar section 4.5.15.2).

Accreditation Units (SOFE 4850)

The following categories are defined by the Canadian Engineering Accreditation Board's Accreditation Criteria and Procedures report, available at: http://ccpe.ca/e/files/report_ceab.pdf.

Basic Science (human cognition, vision, ergonomics, Fitt's Law, usability studies)	25%
Engineering Design (interface and interaction technique design)	50%
Complementary Studies (collaboration, ethnography, interview techniques, public speaking, research ethics)	25%
Total	**100%**

Participation

Participation will be graded based on participation in class discussions in lectures, lab activities, and online. An estimate grade will be reported after the first 5 weeks of class but will not count, giving students feedback to improve participation.

Group Work

A large portion of the work in this course will be group-based. You will be assisted early in the semester to form a project team of 4 people. *All group members must be registered in the same lab section, as lab activities will be used to assist your progress in your term project.* Blackboard will be used for students to post introductions about themselves, and several initial project ideas. From this, students will form teams whose members are ideally passionate about the same topic, work well together, and whose skills are complementary.

Groups are expected to resolve conflicts and organize workload internally where possible – learning to work with others is part of the UOIT experience. However, if serious issues arise, groups may schedule a meeting with the professor. Group project grades are generally the same for all students, however, adjustments for unequal contributions are possible following the group grading policy found with the project roadmap.

The group project is cumulative – each stage builds on the previous stages. In certain cases, the instructor may request students to revise their submission before continuing to the next stage. In these instances, an extension will be granted as appropriate.

Assignments and Tests

Assignments will be evaluated based on the correctness of solutions and clarity of argument or reasoning. Marks may be deducted for assignments which are poorly written or disorganized.

Assignments will be distributed and handed in using Blackboard. Assignments are due at 11:59pm on the due date.

Mid-term Test: Friday, October 17 (tentative).

If a scheduled midterm exam in a Science course will conflict with another test or a course you must contact the Science Academic Advising Office at least 7 days before the date of the exam. Special early exam arrangements may be made under these circumstances if the student applies by the deadline.

Collaboration: Except the group project, all assignments and tests are to be completed individually. Lecture and laboratory activities may be collaborative as described by the instructor or TA for each activity.

Lateness: Students are expected to complete the required assignments on time. This is especially important due to the cumulative nature of the term project. Extensions will be granted on request and with an acceptable reason. 10% per day will be deducted from unexcused late assignments for a maximum of 4 days (including weekends), after which the assignment will not be accepted. Late submission of group assignments will not necessarily result in an extension on the next part!

Missed assignments and tests: When a student has sufficient grounds for special consideration (such as documented illness or death in the family) the normal policy is to re-weight the remaining work in the course to account for the missing grade, in accordance with the regulations at http://www.science.uoit.ca/undergraduate/academic-policies.php (Science) and http://www.engineering.uoit.ca/undergraduate/academic-support/student-policies (Engineering). Students who do not provide sufficient grounds, as determined by the course instructor in consultation with the appropriate Faculty Academic Advising Office, will receive a grade of zero for the missed work. **There are no make-up exams, tests, labs, or assignments.**

Students who have legitimate grounds for missing a test/exam should not write the exam expecting to later decide whether or not the exam will count. If you choose to write an exam under any circumstances the decision is irreversible. If you are concerned about your ability to perform on the exam, you should speak to your Faculty Academic Advising Office about your options in advance of the exam.

Remarking: It is very important that all assessments are properly graded. If you believe there is an error in your assignment or exam grading, please submit an *explanation in writing* within 2 days of receiving the grade. No remarking requests will be accepted orally, and no re-grade requests will be accepted more than 7 days after return of the assignment.

Computer Science Study Room

J 123A is available as a drop in study room for students registered in this course. Check the schedule on the door for details.

Academic Integrity

Students and faculty at UOIT share an important responsibility to maintain the integrity of the teaching and learning relationship. This relationship is characterized by honesty, fairness and mutual respect for the aim and principles of the pursuit of education. Academic misconduct impedes the activities of the university community and is punishable by appropriate disciplinary action.

Students are expected to be familiar with and abide by UOIT's regulations on Academic Conduct (Section 5.15 of the Academic Calendar) which sets out the kinds of actions that constitute academic misconduct, including plagiarism, copying or allowing one's own work to copied, use of unauthorized aids in examinations and tests, submitting work prepared in collaboration with another student when such collaboration has not been authorized, among other academic offences. The regulations also describe the procedures for dealing with allegations, and the sanctions for any finding of academic misconduct, which can range from a resubmission of work to a failing grade to permanent expulsion from the university. A lack of familiarity with UOIT's regulations on academic conduct does not constitute a defense against its application.

Further information about academic misconduct can be found in the Academic Integrity link on your laptop. Extra support services are available to all UOIT students in academic development, study skills, counseling, and peer mentorship. More information on student support services can be found in the Academic Calendar (Section 8).

Further information on academic integrity is available at:

http://uoit.ca/main/current-students/academics-and-programs/programs-and-resources/academic-integrity/index.php

Final Examination

The final exam will be cumulative, including all material in the course. Final examinations are held during the final examination period at the end of the semester and may take place in a different room and on a different day from the regularly scheduled class. Check the published Examination Schedule for a complete list of days and times.

Students are advised to obtain their Student ID Card well in advance of the examination period as they will not be able to write their examinations without it. Student ID cards can be obtained at the Campus ID Services, in G1004 in the Campus Recreation and Wellness Centre.

Students, who through religious obligations are unable to write a final examination when scheduled, will be permitted to write a deferred examination. These students are required to submit a Request for Accommodation for Religious Obligations to the Faculty concerned as soon as possible and no later than three week prior to the first day of the final examination period.

Further information on final examinations can be found in Section 5.24 of the Academic Calendar.

Freedom of Information and Protection of Privacy Act

The following is an important notice regarding the process for submitting course assignments, quizzes and other evaluative material in your courses in the Faculty of Science / Engineering and Applied Science.

As you may know, UOIT is governed by the *Freedom of Information and Protection of Privacy Act* ("FIPPA"). In addition to providing a mechanism for requesting records held by the university, this legislation also requires that UOIT not disclose the personal information of its students without their consent.

FIPPA's definition of "personal information" includes, among other things, documents that contain both your name and your Banner ID. For example, this could include graded test papers or assignments. To ensure that your rights to privacy are protected, the Faculty of Science / Engineering and Applied Science encourages you to use only your Banner ID on assignments or test papers being submitted for grading. This policy is intended to prevent the inadvertent disclosure of your information where graded papers are returned to groups of students at the same time. If you still wish to write both your name and your Banner ID on your tests and assignments, please be advised that UOIT will interpret this as an implied consent to the disclosure of your personal information in the normal course of returning graded materials to students.

If you have any questions or concerns relating to the new policy or the issue of implied consent addressed above, please contact the UOIT Chief Privacy Officer at accessandprivacy@uoit.ca.

Accessibility

Accommodating students with disabilities at UOIT is a responsibility shared among various partners: the students themselves, SAS staff and faculty members. To ensure that disability-related concerns are properly addressed during this course, students with documented disabilities and who may require assistance to participate in this class are encouraged to speak with me as soon as possible. **Students who suspect they have a disability that may affect their participation in this course are advised to go to Student Accessibility Services (SAS) as soon as possible.** Maintaining communication and working collaboratively with SAS and faculty members will ensure you have the greatest chance of academic success.

Students taking courses on the North Campus Location can visit Student Accessibility Services in the U5 Building located in the Student Life Suite

Students taking courses on the Downtown Oshawa Campus Location can visit Student Accessibility Services in the 61 Charles St. Building, 2nd Floor, Room DTA 225 in the Student Life Suite.

Disability-related support and accommodation support is available for students with mental health, physical, mobility, sensory, medical, cognitive, or learning challenges. Office hours are 8:30am-4:30pm, Mon-Fri. For more information on services provided, you can visit the SAS website at http://uoit.ca/studentaccessibility

Students may contact Student Accessibility Services by calling 905-721-3266, or email studentaccessibility@uoit.ca

Students who require the use of the Test Centre to write tests, midterms, or quizzes MUST register online using the SAS test/exam sign-up module, found here www.uoit.ca/SASexams. Students must sign up for tests, midterms or quizzes AT LEAST seven (7) days before the date of the test.

Students must register for final exams by the registration deadline, which is typically 2 weeks prior to the start of the final examination period. SAS will notify students of the registration deadline date.

Professional Conduct

Please participate respectfully in lectures – contribute to discussions and listen politely to your peers. I will not tolerate excessive talking, loud eating, use of mobile phones, gaming, wearing

of headphones, or any other disruption which may disturb my teaching or the learning experience of other students.

Research has shown that laptop use during classes can reduce learning outcomes [1]. You should only use your laptop for course-related work during lectures. This includes: following along on slides, participating in back-channel chat on course-related topics, taking notes, and completing in-class activities. Disruptive laptop use (gaming, coding, other class work, etc.) will not be tolerated. While the UOIT laptop program provides us with a useful learning tool, there may be times when I request that your laptops are closed, for example during student presentations.

Activities in this course require students to interact with members of the university and wider community in the role of ethnographic researchers. When carrying out these assignments students are expected to adhere to all ethical research guidelines discussed in class, as well as to represent UOIT in a professional manner (punctual, professional attire, polite, etc.).

[1] Fried, C. In-class laptop use and its effects on student learning. *Computers & Education* 50(2008), 906—914. http://dx.doi.org/10.1016/j.compedu.2006.09.006

Course Evaluations

Student evaluation of teaching is a highly valued and helpful mechanism for monitoring the quality of UOIT's programs and instructional effectiveness. To that end, course evaluations are administered by an external company in an online, anonymous process during the last few weeks of classes. Students are encouraged to participate actively in this process and will be notified of the dates. Notifications about course evaluations will be sent via e-mail, and posted on Blackboard, Weekly News and signage around the campus.

In addition to the formal evaluation process at the end of term, student feedback is encouraged and welcome through the semester. Students may contact the instructor to discuss any issues related to lectures or tutorials and to make suggestions throughout the term. Online feedback activities will take place throughout the term, and students are encouraged to use them fully.