



**Carleton**  
UNIVERSITY

Department of  
**Systems and  
Computer Engineering**

## **SYSC 4906**

### **Human-Computer Interaction (HCI)**

#### **Calendar description**

Introduction to human-centric research with a focus on security and privacy. Topics include: privacy and security for different types of users, integrating privacy and security in software development, privacy and security in IoT devices from users' perspective, the design and development of secure systems, users' perception of and attitudes towards privacy and security, ethical considerations for human-centric research.

Lectures: 2x1.5hr/week, Lab/problem analysis: 1.5hrs/week

#### **Prerequisites**

SYSC3020 OR SYSC3120 (or equivalent)

#### **Course objectives**

Human-Computer Interaction (HCI) is defined by the ACM as “a discipline that is concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them”. Systems without proper consideration to the human aspect can cause user frustration, errors, and sometimes can lead to catastrophic incidents. This course will provide students with a foundational understanding of the field of HCI to enable them to design and build usable applications.

#### **List of topics**

Topics addressed in this course include:

- Introduction to HCI, interface types
- Data gathering: study design, participant recruitment for different types of studies (e.g., user studies, interview studies, field studies)
- Inspection methods (e.g., Heuristic evaluation, cognitive walkthrough)
- Quantitative analysis (descriptive statistics, inferential statistical, post-hoc analysis)
- Qualitative analysis (grounded theory, thematic analysis, affinity diagrams)
- Conceptualizing interaction, cognitive process, mental models
- User-centric requirements' gathering, prototyping
- Interaction design in-practice (design patterns, AgileUX, tools for interaction design)
- Dark patterns, and ethics in user research

- Persuasive technology and accessibility
- Design for technical users (e.g., software engineers, security admins)
- Designing for privacy and security (AKA usable privacy and security)

## **Learning outcomes**

By the end of this course, students should be able to demonstrate an understanding of:

1. The different types of interfaces, main research and design considerations for each interface type
2. Design models and frameworks, dark patterns, and ethical considerations in user-centric research
3. The role of user-centric research in practice, including its place in Agile development projects
4. The nuances of designing and building systems that address privacy and security, as well as systems targeting technically-advanced users (e.g., software developers, system administrators)

Students should be able to:

5. Determine the best interface type for different types of applications or activities
6. Plan and design user-centric studies (identifying the most suitable study type, recruiting a representative sample)
7. Carry out evaluations to determine the usability of systems, and identify areas of improvement
8. Collect, analyze, represent, and interpret quantitative and qualitative data, and make decisions based on insights from data analysis
9. Design and build systems that employ principles of persuasive technology and accessibility guidelines
10. Use different types of tools to facilitate user-centric research activities, including data analysis tools, data visualization tools, user study software, and opensource design resources
11. Build system prototypes, and use these prototypes to test usage scenarios that were identified through user-centric requirement analysis

## **Graduate Attributes (GAs)**

The Canadian Engineering Accreditation Board requires graduates of engineering programs to possess 12 attributes at the time of graduation. There are no GA's related to this course. For more information, please visit: <https://engineerscanada.ca/>.

## **Instructor and TA contact**

Specific to course offering (tbd)

## **Textbook (or other resources)**

Specific to course offering (tbd)

## **Evaluation and grading scheme**

Specific to course offering (tbd)

## **Breakdown of course requirements**

Specific to course offering (tbd)

## **Tentative week-by-week breakdown**

Specific to course offering (tbd)

## **Important Information**

Specific to course offering (tbd)

## **General regulations**

**Attendance:** Students are expected to attend all lectures and lab periods. The University requires students to have a conflict-free timetable. For more information, see the current *Undergraduate Calendar, Academic Regulations of the University, Section 2.1.3, Course Selection and Registration and Section 2.1.7, Deregistration*.

**Health and Safety:** Every student should have a copy of our Health and Safety Manual. A PDF copy of this manual is available online: <http://sce.carleton.ca/courses/health-and-safety.pdf>

**Deferred Term Work :** Students who claim illness, injury or other extraordinary circumstances beyond their control as a reason for missed term work are held responsible for immediately informing the instructor concerned and for making alternate arrangements with the instructor and in all cases this must occur no later than three (3.0) working days after the term work was due. The alternate arrangement must be made before the last day of classes in the term as published in the academic schedule. For more information, see the current *Undergraduate Calendar, Academic Regulations of the University, Section 4.4, Deferred Term Work*.

**Appeal of Grades :** The processes for dealing with questions or concerns regarding grades assigned during the term and final grades is described in the *Undergraduate Calendar, Academic Regulations of the University, Section 3.3.4, Informal Appeal of*

### Grade and Section 3.3.5 Formal Appeal of Grade.

**Academic Integrity:** Students should be aware of their obligations with regards to academic integrity. Please review the information about academic integrity at: <https://carleton.ca/registrar/academic-integrity/>. This site also contains a link to the complete Academic Integrity Policy that was approved by the University's Senate.

**Plagiarism:** Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated.

**Academic Accommodation:** You may need special arrangements to meet your academic obligations during the term. You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <http://www.carleton.ca/equity/> For an accommodation request, the processes are as follows:

- **Pregnancy or Religious obligation:** Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>
- **Academic Accommodations for Students with Disabilities:** The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your **Letter of Accommodation** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). **Requests made within two weeks will be reviewed on a case-by-case basis.** After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website ([www.carleton.ca/pmc](http://www.carleton.ca/pmc)) for the deadline to request accommodations for the formally-scheduled exam (*if applicable*).
- **Survivors of Sexual Violence:** As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/sexual-violence-support/>.
- **Accommodation for Student Activities:** Carleton University recognizes the substantial benefits, both to the individual student and for the university, that

result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

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