CS 428: Human Computer Communication
CS 730: Human-Computer Interaction Fundamentals

Territorial acknowledgement: The University of Regina is situated on the territories of the nêhiyawak, Anihšināpēk, Dakota, Lakota, and Nakoda, and the homeland of the Métis/Michif Nation. The Regina campus is on Treaty 4 lands, and Saskatoon classes are on Treaty 6 lands.

Instructor:	Daryl Hepting
Format:	Online
Lecture:	Tuesdays and Thursdays, 11:30 – 12:45 UTC -0600
	January 9, 2024 – April 11, 2024
	(synchronously, remotely, through Zoom)
Office Hours:	Monday and Wednesday, 13:00 – 16:00 UTC -0600
	(in-person in the CS Department and remotely through Zoom)
Websites:	https://urcourses.uregina.ca
	https://www2.cs.uregina.ca/~hepting/teaching/CS-428+730/202410/
Contact:	using UR Courses e-mail

Course description:
Theory related to the design of usable software. Topics include contexts for human computer interaction, foundations of usability, cognitive models, perceptual models, social models, physical capabilities, accessibility, interface standards, user experience, principles of good design.

Course objectives:
1. To understand the reasons for prioritizing interface design
2. To learn about the ways computers can present and receive information
3. To learn how humans interpret information and form intentions
4. To understand the standard interfaces for common platforms
5. **To understand when alternative interfaces are appropriate**

Prerequisites: CS 215 and CS 280 (for CS 428)

Textbooks and reference material:
- Yvonne Rogers, Helen Sharp, and Jennifer Preece, Interaction Design: Beyond Human-Computer Interaction, 6th Edition. John Wiley & Sons, Hoboken, NJ, 2023. https://www.id-book.com/ (ID-Book)

- Don Norman, The Design of Everyday Things: Revised and Expanded. Basic Books, New York, 2013 (DoET)

- R. Spielman, W. Jenkins, and M. Lovett, Psychology, 2nd edition, https://openstax.org/details/books/psychology-2e (Psych)

- Interaction Design Foundation, The Encyclopedia of Human-Computer Interaction, 2nd Edition. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed (IDFE)

Additional requirements: a computer with camera and microphone, and a stable internet connection.

Grading:
• Responses to Meetings	10%
• Quizzes before Meetings	10%
• Assignments	40%
• Midterm Exam	10%
• Final exam	30%

Students must pass the final exam to pass this course. A failing grade in the final exam may result in that grade being posted as the final grade in this course. Whether the final exam will be delivered remotely or in person is yet to be finalized. Proctortrack may be used when delivering online exams.

Late assignments/missed exam policy:
Late assignments will be penalized by a percentage of the assigned grade. If the midterm exam is missed for approved reasons, extra weight will be placed on the final exam. If you miss the final exam, you will receive an NP as your final grade.

Attendance policy: Attendance at course meetings is expected. Students are encouraged to record their attendance on UR Courses.

Academic Integrity:
Academic integrity requires students be honest. Assignments and exams are to help students learn; grades show how fully this goal is attained. Thus, all work and grades should result from a student's own understanding and effort.

Acts of academic misconduct violate academic integrity, and are considered serious offences by the University. Examples include, but are not limited to, cheating on tests or exams, plagiarizing, copying from others, and submitting the work of others as your own. Instances of academic misconduct will be reported to the Associate Dean Academic (CS 428) or the

Associate Dean FGSR (730) for investigation. Students are encouraged to understand their obligations as a student, as well as their rights. Details are provided on the uregina.ca website:

- https://academic-integrity.uregina.ca/
- https://www.uregina.ca/student/registrar/resources-for-students/academic-calendars-and-schedule/undergraduate-calendar/index.html
- https://www.uregina.ca/gradstudies/current-students/academic-integrity/index.html

Accommodations :
Students in this course who may have need for specialized accommodations, should contact the Centre for Student Accessibility (Riddell Centre 229, 306-585-4631), and must discuss their accommodation letter with their Instructor before any accommodations will be granted.

Course topics and schedule:
All dates and topics are subject to change, as necessitated by illness, closures, or other unforeseen circumstances.

Week	Topic
1 (Jan-8)	Foundations of Usability (ID-Book Chapter 1, IDFE Chapter 1) • History of interfaces • Design orientation • You are not your user A successful student will be able to: • Discuss the variety of evaluation methods that are available for human-centred computing systems. [Familiarity] • Explain how one can choose an evaluation method to suit the evaluation need. [Familiarity]
2 (Jan-15)	Industrial Design and Interface Design (DoET Chapter 1, IDFE Chapter 6) • Principles of interaction, system image, design challenge • Case studies: Apollo, Therac, Xerox, Palm • Case studies: Light switches and doors A successful student will be able to: • Discuss principles of interaction, system image [Familiarity] • Discuss industrial design and interface design [Familiarity] • Give examples of industrial and interface designs [Familiarity]

3 (Jan-22)	Human Perception (Psych Chapter 5) • Vision and hearing • Haptics and vestibular • Taste, touch, and time A successful student will be able to: • Discuss the biological basis for human sensory systems [Familiarity] • Discuss the sensitivity and limits of human sensory systems [Familiarity] • Discuss the applicability of different sensory systems to different interface tasks [Familiarity]
4 (Jan-29)	Human Cognition (ID-Book Chapter 4, DoET Chapter 3, IDFE Chapter 5) • Mental models, including ad-hoc vs comprehensive mental models • Sensory integration • Illusion, Gestalt • Abstraction A successful student will be able to: • Discuss the cognitive basis for human perception [Familiarity] • Discuss the way in which senses reinforce or compete with each other [Familiarity] • Explain the cognitive action behind the interpretation of sensory illusions [Familiarity] • Develop an abstraction for an activity or object [Usage]
5 (Feb-5)	Human Interaction Dynamics (ID-Book Chapter 3, DoET Chapter 4, IDFE Chapters 11, 25, 44) • Affordances, conceptual models, familiarity • Gulfs of evaluation and execution • Semiotics A successful student will be able to: • Identify the use of affordances in an interface [Usage] • Discuss the tradeoffs when interfaces are familiar or novel [Familiarity] • Describe the gulf of evaluation and the gulf of execution [Familiarity] • Give an example of a metaphor as a interface [Familiarity]

6 (Feb-12)	Affective Computing (ID-Book Chapter 6, Psych Chapter 10, IDFE Chapter 12) • Emotion and behaviour • Expressive interfaces • Voice interfaces • Annoying interfaces and dark patterns • Pervasive, ubiquitous, and anthropomorphic computing A successful student will be able to: • Explain how emotion and behaviour interact [Familiarity] • Describe an example of an emotionally expressive interface [Familiarity] • Describe the difference between pervasive and ubiquitous computing [Familiarity] • Explain what technology is required to identify an emotion [Usage]
7 (Feb-26)	Accessibility (ID-Book Chapter 1, IDFE Chapter 42, DoET Chapter 5) • Inclusion, exclusion, segregation, integration • Approach, obtain, understand • Alternative interfaces • Errors • Internationalization, localization, cultural considerations A successful student will be able to: • Describe the difference between inclusion and integration [Familiarity] • Provide examples of alternative interfaces [Familiarity] • Explain the importance of providing alternative interfaces [Familiarity] • Describe common interface errors and how they can be avoided [Familiarity] • Give an example of an activity that may be interpreted differently by people with different cultural backgrounds [Familiarity] • Develop a strategy that developers may use to make localization more successful [Usage]
8 (Mar-4)	User Experience (ID-Book Chapter 2, DoET Chapter 6, IDFE Chapter 3) • User-centric design • Tasks, activities, and mappings • Information display A successful student will be able to: • Describe the difference between user centric design and activity centric design [Familiarity] • Describe considerations for displaying information to a user [Familiarity] • Describe the likely mental models of a user for a given interface [Usage]

9 (Mar-11)	Interfaces and Standards (ID-Book Chapter 7 and IDFE Chapters 4, 24) • Interface types • Usability standards (ISO 9241; Apple HIG, Google I/O) A successful student will be able to: • List the variety of interface design types that exist [Familiarity] • Discuss at least one national or international user interface design standard [Assessment] • Discuss how user experience has changed over time [Familiarity]
10 (Mar-18)	Social and Collaborative Factors (ID-Book Chapter 5, IDFE Chapters 4, 24, 27) • Single user versus multi-user • Remote operation • Social engagement • Co-presence A successful student will be able to: • Describe the changes that preceded the social web, and the transition to social computing and gaming [Familiarity] • Choose an appropriate co-presence model for a specific task or activity [Usage] • Describe the difference between synchronous and asynchronous communication [Familiarity] • Compare the HCI issues in individual interaction with group interaction [Usage] • Discuss issues of social concern raised by collaborative software [Assessment]

11 (Mar-25)	Security and Privacy • Identity • Trust and verification • Security policies • Usability and multifactor authentication • Biometrics and accessibility A successful student will be able to: • Explain the concepts of phishing and spear phishing, and how to recognize them [Familiarity] • Explain the concept of identity management and its importance [Familiarity] • Describe the issues of trust in interface design with an example of a high and low trust system [Usage] • Design a user interface for a security mechanism [Assessment] • Analyze a security policy and/or procedures to show where they consider, or fail to consider, human factors [Assessment]
12 (Apr-1)	Design and Evaluation (ID-Book Chapter 7, DoET Chapter 6) • Designing and building the interface • Evaluating and assessing the interface A successful student will be able to: • Select an appropriate interface type for a specific problem [Usage] • Provide an informal assessment of an interface [Usage]
13 (Apr-8)	Review and summary • People-centered design • Define a user-centered design process that explicitly takes account of the fact that the user is not like the developer or their acquaintances. • Detail the processes of design appropriate to specific design orientations.

Each topic in the list above includes one or more learning objectives. Each of these indicates one of three levels of mastery:
- Familiarity: The student understands what a concept is or what it means. This level of mastery concerns a basic awareness of a concept as opposed to expecting real facility with its application. It provides an answer to the question "What do you know about this?"
- Usage: The student is able to use or apply a concept in a concrete way. Using a concept may include, for example, appropriately using a specific concept in a program,

use of a particular proof technique, or performing a particular analysis. It provides an answer to the question "What do you know how to do?"

- Assessment: The student is able to consider a concept from multiple viewpoints and/or justify the selection of a particular approach to solve a problem. This level of mastery implies more than using a concept; it involves the ability to select an appropriate approach from understood alternatives. It provides an answer to the question "Why would you do that?"