**Graphical user interface

Description automatically generated with low confidenceUNIVERSITY OF REGINA**

**DEPARTMENT OF COMPUTER SCIENCE**

**CS 730 – Human-Computer Interaction Fundamentals: Winter 2022**

**Instructor:** Daryl Hepting

**Format:** Online

**Lecture:** Tuesday and Thursday, 13:00 – 14:15 UTC -0600

**Office Hours:**  Tuesday and Thursday, 10:00 – 12:00, 14:30 - 15:30 UTC -0600

**Calendar 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**

* To understand the reasons for prioritizing interface design
* To learn about the ways computers can present and receive information
* To learn how humans interpret information and form intentions
* To understand the standard interfaces for common platforms
* To understand when alternative interfaces are appropriate

**Textbook or Reference Material**

Helen Sharp, Jennifer Preece, Yvonne Rogers, Interaction Design: Beyond Human-Computer Interaction, 5th Edition. John Wiley & Sons, Bridgewater, NJ, 2019. (Chapters 1-6)

[http://www.id-book.com](http://www.id-book.com/)

Norman, D. A. (2013). The Design of Everyday Things: Revised and Expanded. New York: Basic Books. London: MIT Press (UK edition)

R. Spielman, W. Jenkins, M. Lovett. Psychology 2e <https://openstax.org/details/books/psychology-2e> (select chapters)

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> (select chapters)

**Evaluation Methods**

Assignments 25%

Midterm exam 15%

Final exam 50%

Participation 10%

Students must pass the final exam to pass this course.

**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, submitting the work of others as your own, etc. Instances of academic misconduct will be reported to the Associate Dean in FGSR for investigation. More details are provided on the FGSR website:

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.

**Additional Information**

In order to be successful in this course, students must spend a significant amount of time outside of the class reading and preparing for lectures, working on assignments, and studying for exams. This single course is considered half of a full-time load in the Human-Centred Computing graduate program. As such, you are expected to be spending half of your time on this course (15 – 20 hours per week). As the lectures only take about three hours per week, the rest of the time is to be used to prepare in advance of the lectures, to review what you’ve learned after the lectures, to work on the assignments, and to study for the exam.

**Grades**

All grades will be assigned according to the Graduate Calendar Grading System

95-100: An exceptional performance.  
90-94: An outstanding performance.  
85-89: An excellent performance.  
80-84: A very good performance.  
75-79: A good or satisfactory performance.  
70-74: A minimally acceptable performance or marginal pass.   
0-69: An unacceptable or failing performance.

**Course Topics & Schedule**

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| **Week** | **Topic** |
| 1 | Foundations of Usability (Sharp et al., Chapter 1, Encyclopedia Ch 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 | Industrial Design and Interface Design (Norman, Chapter 1, Encyclopedia Ch 6)   * Apollo, Therac, Xerox, Palm * Light switches and doors   A successful student will be able to:   * Give examples of |
| 3 | Human Perception (Spielman 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 | Human Cognition (Sharp Ch. 4, Norman Ch 3, Encyclopedia Ch. 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 | Human Interaction Dynamics (Sharp Ch 3, Norman Ch 4, and Encyclopedia Ch 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 | Affective Computing (Sharp Ch 6, Spielman Ch 10 and encyclopedia Ch 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 | Accessibility (Sharp Ch 1, Encyclopedia Ch. 42, Norman Ch 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 | User Experience (Sharp Ch 2, Norman Ch 6, Encyclopedia Ch 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 | Interfaces and Standards (Sharp Ch 7 and Encyclopedia Ch 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 | Social and Collaborative Factors (Sharp Ch 5 and Encyclopedia Ch 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 | Security and Privacy (reference needed)   * 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 | Preview: Design and Evaluation (Sharp Chapter 7, Norman Ch 6, selected topics from CS 731 and 732)   * 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 | Review, summary, and segue   * 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. |

**Learning Objectives**

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?”

The evaluation methods used in this course will focus on assessing the degree to which students have met these learning objectives.