

# CSCE 572 – Spring 2014

## Human-Computer Interaction

### Course Description

Human-Computer Interaction. Interaction design and evaluation. Interaction modes. System usability. Human-robot interaction. Cooperative systems. Universal design and accessibility.

### Prerequisites

Upper division or graduate standing in CSE or permission of the instructor. Experience with programming in a high level language is expected, but no specific language is required.

### Goals and Learning Outcomes:

The overall goal of this course is to provide students with knowledge and skills necessary to critically evaluate system design from a human-centered approach. The measurable learning outcomes used to determine the degree to which this goal is being met follow:

- Students will describe the design process
  - *Examinations will be used to assess this outcome.*
- Students will apply evaluation tools to a design project
  - *The website evaluation assignment will be used to assess the outcome. A rubric is attached.*
- Students will apply designer tools, techniques, and ideas to interface design
  - *A design project will be used to assess this outcome.*
- Students will critically analyze literature of human-computer interaction
  - *The research paper or annotated bibliography will be used to assess this outcome. A rubric is attached.*

### Course Text and Readings

Yvonne Rogers, and Helen Sharp, and Jennifer Preece, **Interaction Design: Beyond Human-Computer Interaction**, 3<sup>rd</sup> Edition, John Wiley & Sons, Inc. New York, NY, 2011.

Optional text: Catherine Courage and Kathy Baxter, **Understanding Your Users: A Practical Guide to User Requirements Methods, Tools, and Techniques**, Elsevier, 2005.

Selected course handouts – PDFs will be provided (see course outline)

### Overall Structure of the Course

The course is designed to provide students with a variety of contexts for understanding and evaluating human-computer interaction methods and processes. A typical class session will consist of:

- Lecture/discussion of human-computer interaction material
- Group work
- Question/answer sessions

## Course Requirements

All students are required to participate in group and class discussions, take at least one midterm exams, take a final exam, complete assigned exercises, and conduct system evaluations, and participate in short projects.

Some assignments will have both undergraduate and graduate versions. For example, undergraduates will evaluate a single website. Graduate students will evaluate and compare two or more websites.

Undergraduate students will prepare an annotated bibliography for a selected HCI topic.

Graduate students will prepare a research proposal based upon a literature review and discussions with a faculty member [not necessarily the instructor] working in some area of HCI.

South Carolina Honors College students will complete the graduate requirements.

## Course Policies

Students should be familiar with and abide by the Code of Student Academic Responsibility. Any violations will be regarded as **serious** and will result in a minimum penalty of **failure** in the course.

Incompletes will be given only when **serious** and **unanticipated** circumstances prevent the timely completion of course work.

Assignments will be due no later than midnight on the due date. Late assignments will be accepted with 10% penalty until the assignment is graded and returned. After that, they will not be accepted except under extenuating circumstances.

## Assessment and Grading

Exercises (10 at 5 points each)

Undergraduate: Short Projects (5 at 30 points each)

Graduate: Research Paper and Project (150 points)

Midterm Exams (2 at 50 points each)

Final Exam (100 points)

Total points possible (400)

More than 10 exercises will be given; the highest 10 grades will be used.

Students enrolled for graduate credit will be assigned a single more substantive project projects. However, all students will take the same examinations.

Grades will be assigned as follows:

90% A

85% B+

80% B

75% C+

70% C

65% D+

60% D

## Course Outline

- 1. Introduction to Interaction Design. One Week.** What is a computer? How do we interact with it? How can we talk about interaction design? What frameworks can we use? What is the role of the Institutional Review Board in conducting research in HCI?  
Chapter 1: What is Interaction Design?  
Chapter 2: Understanding and Conceptualizing Interaction
- 2. Cognitive and Perceptual aspects. Two Weeks.** What does it mean to be human? What are our cognitive, physical, and emotional capabilities and limitations? How do these influence the design of the systems we use? How can universal design support all users?  
Chapter 3: Cognitive Aspects  
Chapter 4: Social Interaction  
Chapter 5: Emotional Interaction  
Article (PDF): MacKenzie, I. S. (1995). Movement time prediction in human-computer interfaces. In R. M. Baecker, W. A. S. Buxton, J. Grudin, & S. Greenberg (Eds.), *Readings in Human Computer Interaction* (2nd ed.) (pp. 483-493). Los Altos, CA: Kaufmann. [reprint of MacKenzie, 1992]  
Article (PDF): Robinette, K. (2012). Anthropometry and product design (chapter). In Salvendy (Ed.) *Handbook of Human Factors and Ergonomics (4<sup>th</sup> edition)*, John Wiley & Sons.
- 3. Conventional Interfaces and their Evaluation. Two Weeks.** How can graphical user interfaces based upon windows, icons, menus, and pointers be appropriately designed? What tools are available to evaluate them? How can users effectively and efficiently navigate the information resources on the web?  
Chapter 6: Interfaces  
Chapter 7: Data Gathering  
Chapter 8: Data Analysis, Interpretation, and Presentation
- 4. Interface Design. One Week.** How is interface design integrated in the software [and hardware] engineering process? How can designs be made resilient? Secure? [Note: Much of this material overlaps material in other CSCE courses required for all of the undergraduate programs. So emphasis will be on the HCI aspects.]  
Chapter 9: The Process of Interaction Design  
Chapter 10: Establishing Requirements  
Chapter 11: Design, Prototyping, and Construction
- 5. Interface Evaluation. Two Weeks.** How can case studies, theoretical models, participant observation, surveys, and experiments help us design and evaluate interfaces?  
Chapter 12: Introducing Evaluation  
Chapter 13: An Evaluation Framework  
Chapter 14: Evaluation Studies: From Controlled to Natural Settings  
Chapter 15: Evaluation: Inspections, Analytics, and Models

Article (PDF): Lazar, Fang, & Hochheiser (2010). Chapter 14 Working with Human Subjects. In *Research Methods in Human-Computer Interaction*.

6. **Advanced Interfaces and their Evaluation. Three Weeks.** How do networks of users use networks of computers to cooperate and coordinate? How do embedded systems interact with our bodies? How can effective human-robot interaction (HRI) be implemented?

Some material in Chapters 1-8 is relevant to these topics. However, additional readings will be assigned.

Article (PDF): Stanney & Cohn (2012). Virtual environments (chapter). In Salvendy (Ed.) *Handbook of Human Factors and Ergonomics (4<sup>th</sup> edition)*, John Wiley & Sons.

Article (PDF): Zaphiris & Ozok (2012). Human Factors in Online Communities and Social Computing (chapter). In Salvendy (Ed.) *Handbook of Human Factors and Ergonomics (4<sup>th</sup> edition)*, John Wiley & Sons.

Article (PDF): Thrun, S. (2004). Toward a framework of human-robot interaction. *Human-Computer Interaction, 19*, 9-24.

Article (PDF): T. Fong et al., (2003). A survey of socially interactive robots. *Robotics and Autonomous Systems, 42*(3-4), 143-166.

7. **Research Project Reports. Three Weeks.** Time may need to be adjusted depending on the number of presentations.