

Time & Location

TR, 1:20 – 3:20 pm, CS 1236

Instructor

Professor Bilge Mutlu

Office: CS-6381

Email: bilge@cs.wisc.edu

Phone: (608) 262-6635

Office hours: TR 3:30 – 4 pm

Course Website & Forum

<https://canvas.instructure.com/courses/811027>

CS/Psych-770

Human-Computer Interaction

This course is designed to introduce graduate students in Computer Science and Psychology to principles of and research methods in human-computer interaction (HCI), an interdisciplinary area concerned with the study of the interaction between humans and interactive computing systems. Research in HCI looks at major cognitive and social phenomena surrounding human use of computers with the goal of understanding their impact and creating guidelines for the design and evaluation of software and physical products and services in industry.

The course consists of three modules: (1) **principles** of and **literature** in HCI through a set of readings, class presentations, and discussions, (2) empirical **methods** for exploratory and experimental human-subjects research in online lectures and tutorials and weekly assignments, and (3) a group **project** in which student teams will practice these principles and research methods in an application domain.

The course is designed for graduate students in Computer Science and Psychology. However, advanced undergraduates in these programs and graduate students from other programs may take the course with the permission of the instructor. No prerequisites are required to take the course.

Course Structure

The course is designed to follow three modules: (1) *Principles of HCI*, (2) *Human Subjects Research Methods*, and (3) *Project*. Tuesdays will be devoted to the first and second modules and Thursdays will be devoted to the project module.

Principles of HCI

Principles of and literature in HCI is reviewed through a set of readings. Below is a list of topics that will be covered in this module. A comprehensive list of readings on these topics will be posted on the course website.

- W 1.** History and Foundations of HCI
- W 2.** Research Frameworks in HCI
- W 3.** Modeling Social and Emotional Processes
- W 4.** Computer-Mediated Communication
- W 5.** Social and Embodied Interfaces I
- W 6.** Social and Embodied Interfaces II
- W 7.** Computer-Supported Collaborative Work
- W 8.** Speech Interfaces
- W 9.** Games
- W 10.** Crowdsourcing
- W 11.** Information Visualization
- W 12.** Ubiquitous Computing
- W 13.** Assistive and Accessible Interfaces

W 14. Future of HCI

The first hour of each Tuesday class will include a lecture and an extended discussion on that week's topic led by the instructor. As a preparation for the lecture and discussion, students will be asked to complete an average of three readings for each topic and to write a 200-word essay at the beginning of class in some weeks (i.e., a total of 8 essays throughout the semester).

Human Subjects Research Methods

A set of human-subjects research methods and procedures commonly used in HCI will be covered through lectures, tutorials, and weekly assignments. Lectures will be through online videos that students will be required to watch before class time, and class time will be used to discuss the lecture, run tutorials, work on assignments, and so on. Below is a list of the research methods and procedures that will be covered.

- W 1.** Research methods in HCI
- W 2.** What are elements of a research project in HCI?
- W 3.** How to choose research designs? Methodological fit
- W 4.** Experimental design principles
- W 5.** Step-by-step experimental design
- W 6.** Measurement, Part I
- W 7.** Measurement, Part II
- W 8.** Measurement, Part III
- W 9.** Scale construction
- W 10.** Statistics, Part I
- W 11.** Statistics, Part II
- W 12.** Statistics, Part III
- W 13.** Ethnography
- W 14.** Qualitative data analysis

Students will practice a subset of these methods through six weekly assignments that include writing one- to two-page reports of their process and findings. Students will submit their reports by email. See "Material Submission" section below for detailed submission instructions.

Project

Students will conduct a semester-long team project to explore HCI research in critical domains of computing such as web-based services, desktop interfaces, mobile and ubiquitous computing interfaces, and embodied interfaces including virtual agents and robots.

The goals of the project are:

- Completing the required human-subjects research training program and an Institutional Review Board (IRB) application for the project,
- Gaining a theoretical and empirical understanding of the application domain,

- Applying exploratory and experimental research methods in HCI,
- Prototyping user interfaces,
- Designing exploratory and experimental studies,
- Gaining experience in recruiting participants and conducting studies with human subjects,
- Creating generalizable knowledge on how computing can improve aspects of human life.

Class time on Thursdays will be devoted to interim and final project presentations, class discussion, project group work sessions, and feedback on student work. Project teams will consist of three students. Students will be assigned to groups based on their interests and prior experience (as determined by a survey that students will fill in on the first day of class). Project teams will informally present their progress at the milestones listed below (roughly every 2–3 weeks). Class times at other weeks will be used as work sessions. Below is the expected week-to-week timeline of the project, although students should expect changes in the timeline. Project milestones are highlighted with full color.

- W 1.** *No project* – Class introduction, lecture.
- W 2.** *Project assignment* – Project teams are formed. Teams choose topics. Project goals and timeline are discussed.
- W 3.** *Work session* – Teams work and seek feedback from the instructor during class time.
- W 4.** *Preliminary presentation* – Project teams will present their findings from a survey of previous work in the problem area. The goal of this stage is to identify significant but unexplored phenomena in the problem area that teams will focus on for their exploration.
- W 5.** *Work session* – Teams work and seek feedback from the instructor during class time.
- W 6.** *Exploratory study design* – The teams will present their plans for an exploratory study that they will conduct to gain a deeper understanding of the identified phenomena.
- W 7.** *Work session* – Teams work and seek feedback from the instructor during class time.
- W 8.** *Exploratory study findings* – Project teams will present the findings from their exploratory study and the implications of these findings for a follow-up experiment that will further refine their understanding of the explored phenomena.
- W 9.** *Work session* – Teams work and seek feedback from the instructor during class time.
- W 10.** *Experimental study design* – Students will present the design of a follow-up experiment informed by the findings from their exploratory study.
- W 11.** *Work session* – Teams work and seek feedback from the instructor during class time.
- W 12.** *Work session* – Teams work and seek feedback from the instructor during class time.
- W 13.** *No class* – Thanksgiving recess.

- W 14.** *Experimental study findings* – Teams will present the findings from their experimental study and discuss these findings in the light of the findings from their exploratory study.
- W 15.** *Work session* – Teams work and seek feedback from the instructor during class time.
- W 16.** *Final* – Project teams will present their overall project process and discuss the implications of their findings from the exploratory and experimental studies for HCI research and practice. Teams will also prepare their presentations in the form of a research poster and present their work to the department in a poster session that will be organized by the instructor.

Interim milestones will involve informal team presentations and classroom discussion. The final presentation will be formal and considered as the final exam of the class. Generally, presentations should be no longer than 10 minutes and follow the formatting requirements described in the “Material Submission” section of the syllabus. The teams are free in their choice of format for simulations or working prototypes as long as they can be viewed or executed in any platform (e.g., Flash [.swf] or Java [.jar]). Teams will also deliver an eight-page report of their process and findings following the [ACM Conference Proceedings format](http://www.chi2010.org/authors/format.html) (<http://www.chi2010.org/authors/format.html>) by the day of the final presentation. See “Material Submission” section below for further submission instructions.

Grading

Grading criteria:

Essays on HCI principles and participation in classroom discussion:	15%
Weeklong practice assignments on research methods:	30%
Team projects:	50%
Classroom participation:	5%

The first module (Principles of HCI) will be evaluated based on the quality of the written essays and contribution to classroom discussions. Assignments for the second module (Human Subjects Research Methods) will be evaluated based on the quality of the written report. The project module will be evaluated based on students’ performance in conducting user studies, implementing prototypes, preparing demos/presentations, and working in groups. Finally, classroom participation will be involve evaluations of general professionalism, attitude toward coursework, and contribution to class.

Team Grading: At the end of the project, students will be asked to evaluate their own and their teammates’ performance. Team-member evaluations can influence a student’s course grade by up to 10%.

Scoring: As a rule of thumb, students who perform at or better than 80%, 87%, and 94% should expect to receive Bs, ABs, and As respectively, although actual cutoffs might change based on overall class performance. All other matters of scoring will follow university grade policies. More information on grades and university grading policies can be obtained at the [UW-Madison Office of the Registrar](http://www.registrar.wisc.edu/faculty/grades/) (<http://www.registrar.wisc.edu/faculty/grades/>).

Material Submissions

All materials students prepare for any of the three modules of the class should be submitted online through Canvas by the deadline posted for the submission. Individual assignments can be submitted late only under unforeseen circumstances and when discussed with the instructor. Late submissions for team assignments will not be accepted. When submitting assignments, students should follow the following naming convention: *ModuleName-WeekNumber-StudentLastName*. For team submissions, team leader name should be used instead of StudentLastName. All written reports should be in Portable Document Format (.pdf). All presentations should be in Microsoft PowerPoint (.ppt) format. Submission formats for other materials will be specified in assignment handouts.

Policies

Communication: All class material will be available on the [class website \(http://bilgemutlu.com/teaching/hci\)](http://bilgemutlu.com/teaching/hci). Assignment handouts, readings, supplemental materials, and pointers to other resources will be posted on the course website. Announcements will be made through emails sent to the class mailing list. Office hours are the best time to get feedback from the instructor and the teaching assistant on assignments and projects. Other questions, concerns, individual issues, and team communication problems can be discussed by appointment. The instructor and the teaching assistant will also be available for questions via email anytime and phone during work hours.

Classroom recording: Because many of the pictures and videos we present in class are copyright-protected, no student may record or tape any classroom activity without the express written consent of the instructor. If a student has a disability that requires him/her to record or tape classroom activities, he/she should contact the [UW-Madison McBurney Disability Resource Center \(http://mcburney.wisc.edu/\)](http://mcburney.wisc.edu/) to arrange an appropriate accommodation.

Attendance: Students are expected to attend class, arrive on time, participate on a team, and offer comments on readings. In addition, students are expected to offer feedback on and suggestions to improve their classmates' work. If a student needs to miss a class, he/she should email the teaching assistant and the instructor ahead of time and be sure to inform his/her teammates that he/she will not be attending.

Ethics: Students are highly encouraged to share and discuss ideas and required to work in groups for projects. Therefore, ethical and respectful treatment of others' ideas is extremely important and will have an important effect on grading. Academic misconduct will be handled following university policies. It is recommended that students read the [UW-Madison policies \(http://students.wisc.edu/saja/pdf/UWS14.pdf\)](http://students.wisc.edu/saja/pdf/UWS14.pdf) for student rights and responsibilities and academic misconduct.