

CS305, HCI in Software Engineering (formerly Usability Engineering) Beginning of Course Memo for Fall 2008 (version 1.0)

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Office Hours: MW 3-4:30pm, TTh 1-2pm

Class Web site: <http://www.cs.virginia.edu/~horton/cs305>

Teaching Assistant: Ross Gore, ross.gore(at)gmail.com

Prerequisite: CS201 with a C- or better or equivalent. (For SW development maturity and SW engineering lifecycles and process. Also, students should have enough experience in a language to be able to learn to create a user-interface using a GUI library or toolkit in a language like C++ or Java.)

Course Description: Human-computer interaction and user-centered design in the context of software engineering. Examines the fundamental principles of human-computer interaction. Includes evaluating a system's usability based on well-defined criteria. Includes user and task analysis, as well as conceptual models and metaphors. The use of prototyping for evaluating design alternatives. Physical design of software user-interfaces, including windows, menus, and commands.

Course Objectives: Upon completion of this course students will have the ability to:

1. Comprehend fundamental principles of HCI and user-centered design.
2. Evaluate software user interfaces based on defined usability criteria, using methods such as heuristic evaluation and user observation techniques
3. Apply user-centered design and usability engineering principles as they design a variety of software user interfaces.
4. Use prototyping methods to discover requirements and to evaluate design alternatives.
5. Conduct simple formal experiments to evaluate usability hypotheses.
6. Use GUI development libraries and tools to create usable interfaces for simple windowed software applications.

Textbooks:

1. *Interaction Design: beyond Human-Computer Interaction, 2/e.* (The "ID" book.) By Jennifer Preece, Yvonne Rogers, and Helen Sharp.
2. *Task-Centered User Interface Design*, on the Web at <http://hcibib.org/tcuid> ("TCUID")
3. Other readings on the class Web site.

What is HCI?

We'll talk about this in class, but if you want to know more now, try this link:

http://www.chisig.org/resources/whatis_hci.html

Course Organization and Topics:

Unit 1: Introduction

Overview of HCI, interaction design (ID), user-centered development
Readings: Chap. 1 from ID-book and web articles on usability principles, usability guidelines
Assignments, Activities: Evaluation of website or SW system

Unit 2: The Process of Interaction Design

Overview of process. Relation to SE Process. Life-cycle models.
Readings: Book chapters (TCUID, Ch 9 of ID-book), papers on SE and HCI processes, other web readings

Unit 3: Quick Iteration Covering the Full Process

Quick tour of users, tasks, evaluation
Readings: Ch. 12 of the ID-book, TCUID
Assignments, Activities: Software Evaluation with real users

Unit 4: Interfaces and Interactions

Readings: Ch. 6 of the ID-book

Unit 5: Users, Needs, Requirements

Readings: ID-book chapters 10, 2 and 3

Unit 6: Design, Prototyping. Physical UI Design

Readings: ID-book chapter 11, notes

Unit 7: Evaluation

Readings: ID-book chapters 14 and 15

Assignments, Exams, Grading, etc.:

There are assignments where much of the work is group-work -- if a student has very bad grades on individual assignments and also poor participation scores on group projects, this may be taken into account when assigning a final grade.

- **Exam 1 (14%):** Monday, Sept. 29 (subject to change)
- **Exam 2 (14%):** Monday, Nov. 10 (subject to change)
- **Exam 3 (7%):** Final exam period: Saturday, Dec. 13, 10 am.
- **Homework 1 (15%):** Evaluation assignment (small groups)
- **Homework 2 (15%):** Choose from options. Individual, pair or group depending on option.
- **Project (35%):** Choose from options. Groups of 2 or 3 preferred. Degree of difficulty matters.

More details on Assignments:

- **Homework 1: Simple evaluation of a software application.** Groups of at least 3 will carry out an informal evaluation of a software application, by asking users outside your team to execute a set of tasks. You'll observe and document problems you observe in terms of HCI principles.
- **Homework 2:** Suggested options follow. (You can propose something else.)
 - Research paper summary (individual assignment)
 - Physical Design Principles Demonstration in GUI Construction Example (individual)
 - Use of Morae usability evaluation tool on small problem (groups of 2 or 3)
 - UI design for children, older people, and other special groups of users
- **Project:** We prefer you to work in groups of 2 or 3 on the project, but single-person projects can be proposed. Degree of difficulty is calculated as part of the project grade. We encourage you to find a topic that excites and interests you and define your own project (with our help and approval).

But, there is a three-part, well-specified group project you can choose if you want. This will involve doing a user and task analysis, building multiple low-fidelity prototypes and evaluating them, and using these results to create a high-fidelity prototype and evaluating it. You can choose the problem/product that you want to address.

But we encourage you to consider other things. Topics you might want to explore could be:

- An evaluation project in the area of games.
- Evaluation of course management systems (Toolkit, Collab, Moodle).
- Using Wii remote as an interface (perhaps the "Minority Report" interface).
- Some aspect of UIs on smart-phones or other handheld devices. This can include development of a UI using Java ME etc.
- Use of ink interface for Tablet PCs.
- Comparison or evaluation for different UIs for OS's like Vista, Mac Leopard, Linux.
- A larger research-oriented paper (not for pairs or groups).

If you do an evaluation, you'll be required to really observe users and record results. (We'll encourage you to use Morae for PCs applications.)

- **Class participation (up to 5% penalty):**
There will be in-class activities (some announced in advance, some not). You may lose up to 5% if you do not attend class and give your full participation in these activities. If you know you must miss class, I may take this into account if let me know in advance that you'll miss and why.

Honor Policy:

The School of Engineering and Applied Science relies upon and cherishes its community of trust. We firmly endorse, uphold, and embrace the University's Honor principle that students will not lie, cheat, or steal, nor shall they tolerate those who do. We recognize that even one honor infraction can destroy an exemplary reputation that has taken years to build. Acting in a manner consistent with the principles of honor will benefit every member of the community both while enrolled in the Engineering School and in the future.

Students are expected to be familiar with the university honor code, including the section on academic fraud (<http://www.student.virginia.edu/~honor/proc/fraud.html>).

Each assignment will describe allowed collaborations, and deviations from these will be considered Honor violations. If you have questions on what is allowable, ask! Unless otherwise noted, exams and individual assignments will be considered pledged that you have neither given nor received help. (Among other things, this means that you are not allowed to describe problems on an exam to a student who has not taken it yet. You are not allowed to show exam papers to another student or view another student's exam papers while working on an exam.) Send, receiving or otherwise copying electronic files that are part of course assignments are not allowed collaborations (except for those explicitly allowed in assignment instructions).

Assignments or exams where honor infractions or prohibited collaborations occur will receive a zero grade for that entire assignment or exam. Such infractions will also be submitted to the Honor Committee if that is appropriate.

LNEC:

If you have been identified as an LNEC student, please let the Center know you are taking this class. If you suspect you should be an LNEC student, please schedule an appointment with them for an evaluation. I happily and discretely provide the recommended accommodations for those students identified by the LNEC. Please contact me one week before an exam so we can make accommodations.

Student Responsibilities:

Our mutual goal is for you to learn this course material in an effective and enjoyable manner (as much as possible). You also want good grades, and I want you to leave the course feeling good about my effectiveness in teaching you. If everyone has a clear vision of our expectations and responsibilities, we all increase our chances of getting what we want!

- Each student is responsible for coming to class with a commitment to listen and participate in order to get as much as possible out of our class meetings. (So focus on CS305-related materials while in class; don't read the paper, study for other courses, surf the Web, etc.)
Laptops in class: Only use laptops for class-related activities. Often laptop use distracts both you and your neighbors in the classroom.
- My responsibility is to do as much as possible to make the class time valuable and useful. (And I expect you all to let me know when I can do better, perhaps through anonymous email feedback.)
- At certain points in the semester, I may announce what I expect you to do before coming to lecture (read something, work a problem, etc.) and the class meeting will reflect this. At times in the course I will ask you to read pages in the textbook as background before lecture so that I don't have to lecture on basic material or material that would be reviewed from earlier courses.
- You should be able to expect me to not waste too much time on material you've already had before (and I may thus reasonably expect you to review such material outside of lecture).
- You have the right to expect me to be fair and efficient in managing the course, and should let me know when I'm not. (Perhaps through anonymous email feedback.)
- You have the right to know how you're doing in the course (as far as I can determine) as we progress through the term.
- On group or team assignments, you have the responsibility to treat your team's members well, by fully participating in group activities, meeting your responsibilities to the team, and behaving as a professional. In turn, you have the right to be treated this way by each of your team members.
- If there is a problem in a team, it's your responsibility to let me know about any problem with a team or one of its individuals. And then it's my responsibility to try to resolve the problem in as effective and as fair a manner as possible.
- Finally, it's always my responsibility to treat you fairly and with respect.