CS3205, HCI in Software Engineering
Beginning of Course Memo for Spring 2017 (version 1.2)

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Office Hours: Mon 1-2pm; Tue. 12:30-2:00pm; Wed. 1-2pm; Fri. 1-1:30pm
Class Web site: http://www.cs.virginia.edu/~horton/cs3205
Teaching Assistants: TBD; see website for more info

Prerequisite: CS2110 with a C- or better or equivalent. (For SW development maturity and SW engineering lifecycles and process.)

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.

Textbooks:
1. *Interaction Design: beyond Human-Computer Interaction, 4th edition.* (The "ID" book.) By Jennifer Preece, Yvonne Rogers, and Helen Sharp.
   EBook available for under $60. Buy from publisher at:
   https://www.vitalsource.com/products/interaction-design-4e-custom-etext-for-university-jenny-preece-v9781119368656
2. *Task-Centered User Interface Design,* on the Web at http://hcibib.org/tcuid ("TCUID")
3. Readings from *The Design of Everyday Things*, by Donald Norman. ("DOET".) Free electronic version available in Virgo at link in Collab site's Resources area.
4. There will be other required readings posted on the class Web site.

Note: You may be required to purchase some art supplies (e.g. posterboard etc.) for the class! This might be in the range of $10 or so.

What is HCI?
We'll talk about this in class, but if you want to know more now, try this link:
http://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction

Course Organization and Topics (subject to change):

Unit 1: Introduction
   Overview of HCI, interaction design (ID), user-centered development. Some history of HCI.
   Readings: Chap. 1 from ID-book and web articles on usability principles, usability guidelines

Unit 2: The Process of Interaction Design
   Overview of process. Relation to SE Process. Life-cycle models.
   Readings: Chap. 9 of ID-book, papers on SE and HCI processes, other readings

Unit 3: Quick Iteration Covering the Full Process
   Quick tour of users, tasks, evaluation
   Readings: Chap. 12 of the ID-book, TCUID

Unit 4: Interfaces and Interactions

Readings: Chap. 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.:

Your grade will be determined as follows:
- **Exams:** 45%
- **Project Group-work:** 35%
- **Homeworks:** 18% (includes Project Part 1, which is individual)
- **Course Karma Points:** 2%

Here is a more detailed breakdown, with <u>tentative</u> dates when things will be due.
- **Exam 1 (18%):** Thu., Feb. 23
- **Exam 2 (18%):** Thu., April 13
- **Exam 3 (9%):** Final exam period: Thur., May 4 ~~12~~, 10am-noon. (Note this is a "half-exam.")
- **Homework 1 (3%):** Web site evaluation (individual), due Tue., Feb. 7
- **Homework 2 (4%):** Wall of Shame (individual or pairs). Main submission due Tue., Mar. 21
- **Homework 3 (3%):** Exercise to evaluate the physical design of a website, due Tue., 25 Apr.
- **Homework 4 (6%):** Choose from options. (Individual, pair or group), due Tue., 2 May
- **Project Part 1 (2%):** Proposal for Project Ideas (individual), due Fri., Jan. 27 (probably)
- **Project Part 2 (11%):** Analysis of users and task, conceptual model (group), due Tue., Feb. 28
- **Project Part 3 (11%):** Low fidelity prototypes (group), due Tue., 28 Mar.
- **Project Part 4 (11%):** Evaluation (group), due Tue., Apr. 18
- **Project Final Document Quality (2%):** Part 4 submitted in final document, so also Tue., Apr. 18
- **Course Karma Points (2%):** You can earn these points through certain class participation activities or other ways of showing positive engagement in the class' learning activities. Part of this might be based on attendance. I plan for there to be many opportunities to earn points.

More details on Assignments:
- **Homework 1:** Evaluation of common tasks carried out on a type of website or app everyone uses.
- **Homework 2:** Find and describe an example of poor usability (and document it) for a class-prepared Wall of Shame. Students may work in pairs, and there will be a competition aspect to this.
- **Homework 3:** A short exercise where you'll apply principle of physical design and layout to evaluate one or more webpages or interfaces we give you.
- **Homework 4:** Student choice! You'll have over a month to work on this. Example options follow.
  - Research paper summary (individual assignment)
  - Physical Design Principles Demonstration in GUI Construction Example (individual)
  - UI design for children, older people, and other special groups of users
  - Project that uses "gadgets" we have for the class (VR, brain-wave device, motion detection devices, etc.)
  - More details and options will be presented later. (Note this assignment is due last.)

- **Project:** For the project you will take a proposed idea for some kind of software application, and then carry out HCI analysis, design and evaluation activities for that proposed application. (You won't actually implement it; the work ends after you prototype the user interface.) The project will be a significant amount of work, and it's best to find an application that excites and interests you. Individuals will create project ideas that propose applications to design (Project Part 1), and these will be shared among all students. Students will indicate which projects they'd like to work on, and we'll use that to create groups. Groups will normally be 3 students.

After groups are formed, the assignments (Parts 2, 3, and 4) are a well-specified sequence of activities and deliverables. The work 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. Group members will evaluate each other, and the grades on each part may be adjusted based on evaluations by group members and the TAs. Groups that have an issue (or potential issue) with a team-member should bring it to the attention of the instructor as early as possible. If a student has a concern about a potential safety concern related to team membership or team meetings, contact the instructor.

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.virginia.edu/honor/what-is-academic-fraud-2/).

Each assignment will describe allowed collaborations, and deviations from these will be considered Honor violations. If your submission significantly uses materials that are taken from sources outside class resources, you must give attribution.

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 mean 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. Serious infractions may lead to failing the course. Infractions will also be submitted to the Honor Committee if the instructor decides that is appropriate.

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 feel 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 I request that you focus on CS3205-related materials while in class; don't read the paper, study for other courses, surf the Web, etc. My responsibility is to do as much as possible to make the class time valuable and useful. For some classes, class time will be more valuable if you have read or prepared something before coming to class, and on such occasions I will give you fair warning and may have a class activity that may only work well if you have. (And there might be something that will affect your Course Karma Points that day.)

If you experience anything unfortunate in your life that affects your performance in this course, please know that you can come talk to me about how this affects you in the course or in general. Or you can just ask me about other resources available at the university. UVa has many sources of support and assistance, and if life throws you a curveball, please don't hesitate to seek advice and help from your friends and from your UVa community.

SDAC (formerly LNEC):
If you are working with Student Disability Access Center (SDAC), please let the Center know you are taking this class. If you suspect you have issues that SDAC could help you with that might affect you in this class, please schedule an appointment with them for an evaluation. I happily and discretely provide the recommended accommodations for those students registered with SDAC. Please contact me with the approved paperwork at least one week before an exam so we can make accommodations.

Research:
Your class work might be used for research purposes. For example, we may use anonymized student assignments to design algorithms or build tools to help programmers. Any student who wishes to opt out can contact the instructor or TA to do so after final grades have been issued. This has no impact on your grade in any manner.