

IEOR 170 : Industrial Design and Human Factors

Spring 2007

Class Web Site: <http://lbs.cs.berkeley.edu:8080/ieor170>¹

CCN: 41030, 3 Credit Units, Upper Division Standing

Lecture Hours: 3106 Etcheverry Hall, MW 5:00-6:30pm

Instructor: Jingtao Wang, Email: jingtaow@cs.berkeley.edu,

Homepage: <http://www.cs.berkeley.edu/~jingtaow>

GSI : Tingting Cui, Email: tingting@ieor.berkeley.edu

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Office Hours: Jingtao: 417 Soda, MW 1:00PM - 2:00PM or by appointment

Tingting: 1116 Etcheverry, W 2:00PM - 3:00PM or by appointment

Textbook: There is no required textbook for this class. There will be readings assigned for each lecture. The readings will be available online through the class web site. Some of the readings will be password protected due to copyright issues. To access those protected readings, please use user name: **ieor170**, password: **stud3ntacc3ss** (i.e. remove the space between phrase “student access”, then replace two ‘e’s with two ‘3’s) when downloading them. If you are interested in reading further take a look at the recommended reading list on the class website.

Overview

This course surveys topics related to the design of products and interfaces ranging from alarm clocks, cell phones, and aircraft cockpits to logos, presentations, and web sites. Design of such systems requires familiarity with Human Factors and Ergonomics, including the physics and perception of color, sound, and touch, as well as familiarity with case studies and contemporary practices in interface design and usability testing. Students will solve a series of design problems individually and in teams.

In addition to lectures, the class will analyze a number of case studies in depth and expert speakers from leading research labs and universities will present current perspectives. Students individually and in teams will design and prototype a series of projects which will be analyzed through in-class critique. The goals of the course are to familiarize students with fundamentals of human factors/ergonomics, increase student awareness of design in everyday experience, and enhance student skills in creativity and presentation. This course is intended primarily for engineering students. It requires senior standing in Engineering but no prior knowledge of design.

¹ Will switch to <http://lbs.cs.berkeley.edu/ieor170> by this week end.

² Please avoid emailing the TA and the Instructor directly for topics related with your homework, class projects etc. You are likely to receive a response much faster if you use this email address.

Course Organization

The course is organized into five major topics as described below. The first two and part of the third topic will be covered before spring break; the second two and half afterwards. The midterm will cover only material presented in class up until that date. The final exam will be comprehensive and will cover all class material.

1. Design Process (Jan 18 – Feb 26)

- ◆ Design process
- ◆ Brainstorming, Idea Logs and Storyboarding
- ◆ Design Principles
- ◆ Task Analysis and User Requirement Analysis

2. Sensory Perception in Design (Feb 28 – Mar 7)

- ◆ Visual perception and website design
- ◆ Auditory perception and sound models
- ◆ Tactile perception, haptic interfaces.

3. Human Factors Theory - Design for Safety and Efficiency (Mar 14 - Apr 26)

- ◆ Fitts' Law
- ◆ Model Human Processor and GOMS.
- ◆ Ergonomics and anthropometrics

4. Evaluation Techniques (Apr 4 – April 16)

- ◆ Heuristic Evaluation
- ◆ Designing Experiments
- ◆ Qualitative Evaluation and Quantitative Evaluation

5. Design Applications, Interactive Design and the Internet (Apr 18 – May 9)

- ◆ Topics on Visualization, Art and Design
- ◆ Topics on Internet/Web
- ◆ Topics on Mobile Devices

Grading

- Class participation and Readings (10%)
- Homework Assignments (20%)
- Midterm (15%)
- Design Project (25%)
- Design Notebook (10%)
- Final (20%)

Design Assignment Grading: Design Assignments will be graded on a scale of 0-10. Extraordinary submissions can receive a grade up to 12.

Design Notebook Grading: Students will develop individual Design Notebooks that illustrate good and bad design concepts learned in the class. These will be turned in after very short (3 minute) individual highlight presentations to the instructors and TA.

Note: There is a new policy on requesting grade changes this semester. Please refer to the

document on the class website for the procedure and the grade change request form. Grade changes will not be considered unless follow the procedure detailed there.

Assignments and Project

Students are required to read the readings for each lecture. Each student is required to submit a **one-paragraph** critique/comments on the corresponding class wiki page for **each article** assigned. You may talk about things you like, things you don't like about the article, if you were the author, how you would design the applications/write the article? Please also take the constraints/trade-offs at the time when the article was written into account, so be constructive in your critique. Discussing relevant but new ideas are also welcome in the critique. The deadline for critique/comments submission is the beginning of each lecture.

The majority of the homework in this class will be oriented around the project. Many of these homework assignments will be done in with your project group, but some assignments (or parts of assignments) must be completed individually. The first assignment starts on Week 2. Please check the class web site for individual and team assignment schedule (the schedule may change over the course of the semester and we may choose to add or drop assignments).

Recommended Resources³

- ◆ *The Design of Everyday Things*. Donarld Norman, Basic Books. 2002.
- ◆ *By Design*. Ralph Caplan, Rairchild Publications, Inc. 2nd Edition. 2005.
- ◆ *Design for the Real World*. Victor Papanek, Academy Chicago Publishers. 2nd Edition. 1985
- ◆ *The Non-Designer's Design Book*. Robin Williams, Pearson Education; 1994
- ◆ *The Psychology of Human Computer Interaction*, Stuart K. Card et al., Lawrence Erlbaum Associates; 1983
- ◆ *Human-Computer Interaction*, Alan Dix, et al, Prentice Hall. 3rd Edition, 2004.
- ◆ *Task-Centered User Interface Design: A Practical Introduction* (full text available online) Clayton Lewis & John Rieman, 1994.
- ◆ *MAKE: Technology on Your Time*. O'Reilly Media ASIN: B0007RNI5K

³ More can be found at http://lbs.cs.berkeley.edu:8080/wiki/index.php/Recommended_Readings & http://lbs.cs.berkeley.edu:8080/wiki/index.php/Links_of_Interest