



CG 116, Spring 2007**

Human Factors

(revised 3/19/07)

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Textbook & Readings: 2 required texts. Both are available at the Brown Bookstore.

Wickens, Christopher D., & Hollands, Justin G. (2000) *Engineering Psychology and Human Performance* (Third Edition).

Norman, D. A. (2002). *The design of everyday things*. (pbk.) New York: Basic Books.

Journal articles and readings from other books will be discussed as well, and are available through the *myCourses* site for the course. These are designated by an asterisk (*) on the reading list below.

Course Goals: Human factors studies the things people use and the environments in which they use these things to better match the capabilities, limitations, and needs of people. This course will focus on human cognitive capacities and how an understanding of them should inform the design of such every day things as tools, information displays, work aids, and computer software design. The goal is to help students learn and apply cognitive science theory and principles to increase the convenience of use of man-made objects and systems, to reduce errors, and to increase productivity, improve safety and comfort associated with using such tools and systems.

Course Requirements: In addition to doing the readings and participating in class, each student will prepare four informal presentations for the rest of the class (some presentations individually and others as part of a small group), and a larger final project. The final project will require students to work in teams to apply the theory and concepts covered in the course to the real-world evaluation of the implementation at Brown of Banner system for student records and registration.

Course Format: Some lectures, student presentations, discussion, case study analysis.

Grading: The final course grade will be determined by performance on the four student presentations (10% each), class attendance and participation (10%), and the final project (50%).

** Why a shopping cart? See the course *myCourses* site to find out.

Course Calendar

Week	Dates	Topic	Textbook Chapters (W&H)	Additional Reading (* indicates reading available on course website)
1	January 24 -26	Introduction and History Signal Detection Theory	1	Norman, D. A. (2002). <i>The design of everyday things</i> . New York: Basic Books. (Ch. 1 – “The psychopathology of everyday things”)
2	January 30 - February 2	Signal Detection Theory Attention and Information Theory	2 9	* Williges, R. C. (1971). The role of payoffs and signal ratios in criterion changes during a monitoring task. <i>Human Factors</i> , 13(3), 261-267.* Parasuraman, R. (1985). Detection and identification of abnormalities in chest x-rays: Effects of reader skill, disease prevalence, and reporting standards. In R. E. Eberts & C. G. Eberts (Eds.). <i>Trends in Ergonomics/Human Factors II</i> . North Holland: Elsevier. (pp. 59-66) * Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. <i>Psychological Review</i> , 63(2), 81-97. * Barnett, B. J., & Wickens, C. D. Display proximity in multicue information integration: The benefits of boxes. <i>Human Factors</i> , 30(1), 15-24.
3	February 5 - 9	Student Presentations #1: Signal Detection (2/5 and 2/7) Visual Displays, Attention & Navigation		
			3, 4	

Week	Dates	Topic	Textbook Chapters (W&H)	Additional Reading (* indicates reading available on course website)
4	February 12 - 16	Visual Displays, Attention & Navigation Cognitive Load	5 11	* Wickens, C. D. & Long, J. (1995). Object versus space-based models of visual attention: Implications for the design of head-up displays. <i>J. Experimental Psychology: Applied</i> , 1(3), 179-194. * Martin-Emerson, R. & Wickens, C. D. (1997) Superimposition, symbology, visual attention, and the head-up display. <i>Human Factors</i> , 39(4), 581-601. * Sweller, J., & Chandler, P. (1991). Evidence for cognitive load theory. <i>Cognition and Instruction</i> , 8(4), 351-362.
5	February 19 - 23	Long Weekend – No Class, Monday 2/19 Student Presentations #2: Driving and Distraction (2/21 and 2/23)		
6	February 26 - March 2	Displaying Information: Graphs and Charts		* Tufte, E. (1997). <i>Visual Explanations</i> . Cheshire, CT: Graphics Press. *Pinker, S. (1982). <i>A Theory of Graph Comprehension</i> . Cambridge, MA: MIT Center for Cognitive Science Occasional Paper #15.
		No Class, Friday 3/2		
7	March 5 - 9	Language, Communication, and Conceptual Organization	6	
		Student Presentations #3: Portraying Information (3/7 and 3/9)		

Week	Dates	Topic	Textbook Chapters (W&H)	Additional Reading (* indicates reading available on course website)
8	March 12 - 16	Product Design – <i>The Deep Dive</i> Web Design Usability Testing		* Norman, D. A. (2002). <i>The design of everyday things</i> . New York: Basic Books. (Chs. 2, 6, 7) * Krug, S. (2000). <i>Don't make me think: A common sense approach to web usability</i> . Indianapolis: New Riders. Chs. 1 & 2. * Lee, M. J., & Tedder, M. C. (2003) The effects of three different computer texts on readers' recall: Based on working memory capacity. <i>Computers in Human Behavior</i> , 19. 767-783. * Krug, S. (2000). <i>Don't make me think: A common sense approach to web usability</i> . Indianapolis: New Riders. Chs. 9, 10, 11
9	March 19 – 23	Planning for the Final Project Selection of evaluation teams Team assignments, etc. Student Presentations #4: Evaluating sets of instructions (3/21)		
	March 26 – March 30	Spring Break – No Class		
10	April 2 - 6	April 2: Guest Lecture by Mr. Adam Fouse, Human Factors Scientist, Charles River Analytics April 4: Guest Lecture on Audio Displays by Prof. Laurie Heller, Brown University Student Presentations #4: Evaluating sets of instructions (4/6)		* Walker, B. N. & Kramer, G. (2004). Ecological psychoacoustics and auditory displays: Hearing, grouping, and meaning making. In J. G. Neuhoff (Ed.). <i>Ecological psychoacoustics</i> . Amsterdam: Elsevier. (pp. 149-174)

Week	Dates	Topic	Textbook Chapters (W&H)	Additional Reading (* indicates reading available on course website)
11	April 9 - 13	Memory and Domain Expertise Memory & Memory Aids Decision Making	7 8	*Lee, M. J., & Tedder, M. C. (2003) The effects of three different computer texts on readers' recall: Based on working memory capacity. <i>Computers in Human Behavior</i> , 19, 767-783. *Tan, D.S., Stefanucci, J.K., Proffitt, D.R., Pausch, R. (2001) The Infocockpit: Providing Location and Place to Aid Human Memory. Workshop on Perceptive User Interfaces 2001, Orlando, Florida. *Stefanucci, J. K., & Proffitt, D. R. (2002). Providing distinctive cues to augment human memory. Poster presented at the 24th Annual meeting of the Cognitive Science Society, Fairfax, VA. *Tversky, A. & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. <i>Science</i> , 185, 1124-1131. *Tversky, A. & Kahneman, D. (1981). The framing of decisions and the psychology of choice. <i>Science</i> , 211, 453-458.
12	April 16 -20	Expertise, Decision-Making, Stress No Class, Friday 4/20 – Teams work on Term Project Assignments	12	*Klein, G. (1998). The recognition-primed decision model. In Klein, G. <i>Sources of power: How people make decisions</i> . Cambridge, MA: MIT Press. (Ch. 3, pp. 15-30)
13	April 23 – 27	Applications: Aesthetics, Emotion, and Design Group Brainstorming on Term Project Sharing preliminary data and findings (4/25, 4/27)		*Tractinsky, N., Katz, A.S., & Ikar, D. (2000). What is beautiful is usable. <i>Interacting with Computers</i> , 13, 127-145. *Norman, D. A. (2004). <i>Emotional Design</i> . New York: Basic Books. (pp. 17-33, 99-115). *OPTIONAL: <u>Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. <i>Information Systems Research</i>, 11(4), 342-365.</u>
	April 30 – May 4	Reading Period – No Class		

Final Project Due – Wednesday, May 16 at 5:00 p.m.