

Course Syllabus

Psychology 744 - Human Information Processing
Fall, 2002

- INSTRUCTOR:** Shari Lane, Ph.D. (713 Poe Hall, 515-1722, sharolyn_converse@ncsu.edu)
Office Hours: T & Th., 3:00 – 4:00 p.m., or by appointment
- COURSE GOAL:** The goal of this course is to review the theory and research of cognitive psychology and cognitive engineering, and to apply this information to the design of superior products and systems.
- TEXT:** Wickens, C.D. (2000). Engineering psychology and human performance. (Third Edition). New York: Harper-Collins.
- EXAMS:** One midterm and one final exam will be given. Each will cover all material presented in lectures, class presentations, and assigned readings. Exams will contain short answer questions. The final exam will be comprehensive.
- PRESENTATION:** Each student will provide an oral review of one or two articles to the class. The article must pertain to one of the topics discussed in class, and should provide information about research and practical applications. The content of the presentation should include information about the: problem being addressed, research method, results, practical implications of the results, and a critique of the article. All students must schedule a meeting with Dr. Lane at least one week before presenting their material. This meeting will ensure that coverage of the topic is appropriate and that the expectations of the instructor and student match. Presentation grades are higher, and you experience less stress, if you practice your presentation before your class appearance.
- CLASS PARTICIPATION:** Class participation will be graded in terms of the following criteria: class attendance, participation in class discussion, and completion of “home work” assignments on time.
- GRADING SYSTEM:** Grades will be calculated with the following formula:
Midterm = 25 % Final = 40% Presentation = 25% Class Participation = 10%
- | | | |
|-------------------|---------------|------------|
| A+ = 98% or above | A = 97% - 90% | |
| B+ = 88% or above | B = 87-83 | B- = 82-80 |
| C+ = 78% or above | C = 77-73 | C- = 72-70 |
| D+ = 68% or above | D = 67-63 | D- = 62-60 |
| F = 59% or below | | |
- HONOR CODE:** All students are expected to conduct themselves in accordance with the honor code published by North Carolina State University.

Course Schedule

<u>Date</u>	<u>Topic</u>	<u>Text Assignment</u>
01/08/02	Introduction	Chapter 1
01/10/02	Theory of Signal Detection	Chapter 2, 17 - 34
01/15/02	Stage Theories of Information Processing and Information Theory	Chapter 2, 44 - 50
01/17/02	Absolute and Multidimensional Judgment	Chapter 2, 50 – 68
01/22/02	University Holiday	

Date	Topic	Text Assignment
01/24/02	Selective & Focused Attention	Chapter 3
01/29/02	Selective and Focused Attention	
01/31/02	Divided Attention	Chapter 11, 439- 4
02/05/02	Mental Workload	Chapter 11, 459- 479
02/07/02	Mental Workload	
02/12/02	Working Memory	Chapter 7, 241 – 260
02/14/02	Working Memory	
02/19/02	Long Term Memory	Chapter 7, 277 - 292
02/21/02	Mental Models and Knowledge Acquisition	
02/26/02	Decision Making	Chapter 8
02/28/02	Midterm Exam	
03/05/02	Spatial and Object Perception	Chapter 4
03/07/02	Spatial and Object Perception	
03/12/02	Spring Break	
03/14/02	Spring Break	
03/19/02	Navigation and Interaction in Real and Virtual Environments	Chapter 5
03/21/02	Navigation and Interaction in Real and Virtual Environments	
03/26/02	Language and Communications	Chapter 6
03/28/02	University Holiday	
04/02/02	Manual Control	Chapter 10
04/04/02	Manual Control	
04/09/02	Automation	
04/11/02	Automation	
04/16/02	Selection of Action	Chapter 9
04/18/02	Selection of Action	
04/23/02	Stress and Human Error	Chapter 12
04/25/02	Process Control	Chapter 13
04/30/02	Situation Awareness	Chapter 7, 260 - 261
05/02/02	Training Cognitive Skills	Chapter 7, 261 -277
05/14/02	Final Exam (1 – 4 p.m.)	

Additional Readings Assignments

Date	Reading
01/10/02	Pigeau, R., Angus, R., O'Neill, P., and Mack, I. Vigilance Latencies to Aircraft Detection Among NORAD Surveillance Operators. <u>Human Factors</u> , 37(3), 622-634. Johnson, V., & Alsop, B. (1996). Human Signal-Detection Performance: Effects of Signal Presentation Probabilities and Reinforcer Distributions. <u>Journal of Experimental Analysis of Behavior</u> , 66, 243-263.
01/15/02	Shannon Theory: Present and Future http://www.itsoc.org/review/frrev.html
01/24/02	Sperling, G., and Weichselgartner, E. (1995). Episodic theory of the dynamics of spatial vision. <u>Psychological Review</u> , 103, 503-532. http://aris.ss.uci.edu/HIPLab/staff/sperling/PDFs/SperlingWeichselgartner95.pdf
01/29/02	Dosher, B. and Sperling, G. (1998). The evolution of psychological theory. In (J. Hochberg, Eds.), <i>A Century of Information Theory: Perceptual Cognition at Century's End</i> . New York, NY: Academic Press, 201-254. http://aris.ss.uci.edu/HIPLab/staff/sperling/PDFs/DosherSperling98.pdf

<u>Date</u>	<u>Reading</u>
01/31/02	Detweiler, M.C., and Luncy, D.H. (1995). Effects of single- and dual-task practice on acquiring dual-task skill. <u>Human Factors</u> , 37(1), 193-211.
02/05/02	Eggemeier, F.T. (1990). Properties of workload assessment techniques. In M. Venturino (Ed.), <u>Selected readings in human factors</u> (pp. 227-248). Santa Monica, CA: The Human Factors Society.
02/07/02	Wierwille, W.W., and Eggemeier, F.T. (1993). Recommendations for mental workload measurement in a test and evaluation environment. <u>Human Factors</u> , 35(2), pp. 263-281.
	Hill, S., Iavecchia, H., byers, J., Bittner, A.C., Zaklad, A., and Christ, R. (1992). Comparison of four subjective workload rating scales. <u>Human Factors</u> , 34(4), 429-439.
02/12/02	Bennet, K., Toms, M., and Woods, D. (1993). Emergent features and graphical elements: Designing more effective configurational displays. <u>Human Factors</u> , 35(1), 71-79.
02/19/02	Gentner, D., and Crudin, J. (1985). The evolution of mental metaphors in psychology: A 90-year retrospective. <u>American Psychologist</u> , 40 (2), pp. 181-192.
02/21/02	Shadbolt, N., O'Hara, K., and Crow, L. (1999). The experimental evaluation of knowledge acquisition techniques and methods: history, problems and new directions. <u>International Journal of Human-Computer Studies</u> , 51, 729-755.
	Chin, D. (2001). Empirical Evaluation of User Models and User-Adapted Systems. User modeling and user-adapted interaction II. Amsterdam: Kluwer Publishers.
02/26/02	Klein, G., Pliske, R., Crandall, B., and Woods, D. (1999). Features of Problem detection. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 133-137.
	Deaton, J, Glenn, F., and Coury, B.. (1999). The value of assistance: An onboard diagnostic interface for Navy rotocraft operation. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 359-363.
03/05/02	Interface Hall of Shame: Visual Elements. Found at http://www.iarchitect.com/visual.htm
03/07/02	Interface Hall of Shame: Interface Stupidity. Found at http://www.iarchitect.com/stupidity.htm
03/19/02	Riley, J., and Kaber, D. (1999). The effects of visual display type and navigational aids on performance, presence, and workload in virtual reality training of telerover navigation. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 1251-1255.
03/21/02	Ruffner, J, Lehrenz, M., and Trenchard, M.. (1999). Human factors issues in the development of an advanced digital moving map systems. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 31-35.

<u>Date</u>	<u>Reading</u>
03/26/02	Interface Hall of Shame: Error Messages. Found at http://www.iarchitect.com/errormsg.htm
04/02/02	Proctor, R. W., and Dutta, A. (1995). Skill Acquisition and Human Performance. Thousand Oaks, CA: Sage, pp. 99-130.
04/04/02	Kaber, D., and Riley, J. (1999). Adaptive Automation of a Dynamic Control Task Based on Secondary Task Workload Measures. <i>International Journal of Cognitive Ergonomics</i> , 3(3), 169-187.
04/09/02	Mosier, K, and Skitka, L. (1999). Automation use and automation bias.. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 344-348.
04/11/02	Norman, D.A. (1990). The "problem" with automation: Inappropriate feedback and interaction, not "over automation." In (D.E. Broadbent, A. Baddeley, and J.J. Reason, Eds.) (pp. 569-576), <u>Human factors in hazardous situations</u> . Oxford, England: Clarendon Press.
04/16/02	Smith, E. (1968). Choice reaction time: Analysis of the major theoretical positions. <u>Psychological Bulletin</u> , 69, 77-110.
04/18/02	Payne, S. (1995). Naïve Judgments of Stimulus-Response Compatibility. <u>Human Factors</u> , 37(3), 495-506.
04/23/02	Matthews, G., and Campbell, S. (1999). Individual differences in stress response and working memory. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 133-137.
	Knech, T., and Hancock, P. (1999). Separation maintenance in high-stress free flight using a time-to-contact-based cockpit display of traffic information. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 133-137.
04/25/02	Rasmussen, J. (1990). Skills, rules, and knowledge: Signals, signs, and symbols. In (M. Venturino, Ed.), <u>Selected readings in human factors</u> (pp. 61-70). Santa Monica, CA.: The Human Factors Society.
04/25/02	Roth, E., and O'Hara, J. (1999). Impact of advances alarms, displays, and computerized procedures on teams. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 133-137.
	Oser, R., Jentsch, F., Bowers, C. and Salas, E. (1999). Using automation to support decision making: Challenges and training research requirements. <u>Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting</u> . Santa Monica, CA: The Human Factors and Ergonomics Society, pp. 133-137.
04/30/02	Endsley, M.R. (1995). Toward a theory of situation awareness in dynamic systems. <u>Human Factors</u> , 37(1), 32-64.

Date **Reading**

05/02/02

Proctor, R. W., and Dutta, A. (1995). *Skill Acquisition and Human Performance*. Thousand Oaks, CA: Sage, pp. 233-262..

Sternberg, R.J., and Frensch, P. A. (1992). Mental models and the acquisition of expert knowledge. In R.R. Hoffman, (Ed.) *The Psychology of Expertise*. New York, NY: Springer-Verlag.