

Human Factors Engineering

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This year's version of Human Factors represents another renovation in the spirit of keeping up to date with emerging concepts in the field. The students learn: (1) the basic principles of controls and displays that apply to conventional machines, (2) principles and practical techniques for occupational safety and health, (3) to recognize special problems that are encountered with computer-based machines including web sites, (4) to extrapolate basic principles to complex systems and environmental design, (5) to devise corrections to real-world situations where any of the foregoing principles could be operating, and (6) to analyze a system for sources of human error under real conditions. In order to make room in the class schedule, there will be comparably less emphasis on the minutiae of controls and displays, although the text is great reference work in that regard.

TEXTS

Dates that appear on the class schedule list target dates for topics. Each class day is not listed separately. Readings are given as book chapters in the text (T#):

Guastello, S. J. (2006). *Human factors engineering and ergonomics: A systems approach*. Mahwah, NJ: Lawrence Erlbaum Associates.

Ratner, J., (2003, 2nd ed.). (Ed.). *Human factors and web development*. Mahwah, NJ: Lawrence Erlbaum Associates.

MATERIALS on RESERVE (Raynor Library)

There will be a few articles on reserve. A list of reserve readings will be handed out separately.



CLASS SCHEDULE

DATE TOPIC

- 1/16 Introduction to human factors (T1).
- 1/18 Usability evaluation methods (T2)
- 1/23 Systems that change over time (T2)
- 1/25 Signal detection theory (T3).

1. Conventional Machines

- 1/30 Vision and visual displays (T4)
- 2/8 Hearing auditory displays, noise (T5)
- 2/15 Cognition (T6).
- 2/20 Web Assignment due.
- 2/22 Psychomotor skill and controls (T7).
- 2/27 Operating standards assignment due.

2. Occupational Health and Safety

- 3/1 Anthropometry, work physiology (T8)
- 3/6 Stress and human performance (T9).
- 3/8 MIDTERM EXAM thru (T8)
- 3/20 Accidents and occupational health (T10)

3. Computer-Based Machines

- 3/27 Controls, displays, computers (T11)
- 4/5 Virtual reality (T11)
- 4/10 Programming, artificial intelligence, artificial life (T12)

4. Complex Systems

- 4/17 More complex systems, automation (T13)
- 4/24 Book Disc: Human Factors and Web Development.
- 4/26 Natural and built environments, transportation (T14)
- 5/1 Outer space (T14)
- 5/3 Term papers due. Paper presentations. FINAL TAKE-HOME EXAM handed out.
- 5/8 FINAL DUE

WEB ASSIGNMENT

The assignment is to visit some web sites related to human factors and ergonomics. A list of sites that students have found interesting will be distributed in class. You should visit at least one of these, and try to find some new ones. Then, identify two that you thought were the most interesting to you and bring in some descriptions of them, perhaps prints of the home page or more substantive pages, along with the URL. (The URL is essential to this task).

OPERATING STANDARDS ASSIGNMENT

The assignment is to find formal standards associated with the proper design of visual displays. The class will divide up types of visual displays such as meters and related numeric displays; heads-up displays, signs for emergencies and danger, signs that do not pertain to emergencies. Standards may be issued by the American National Standards Institute (ANSI), Department of the Army, or DOD specifications for equipment that they buy, Automotive Manufacturing Institute (or similar organization), Federal Aviation Administration, or non-governmental professional engineering organizations. You may have to dig through human factors resources to find applicable standards.

Please limit your report to 5 pages, summarizing material as necessary. Be sure to answer the following: To what aspect of the display does the standard pertain? What is the standard? What agency set the standard? What is the last known date of update for this standard? Provide literature citations and references, or web addresses to support your findings.

BOOK REPORTS

The assignment is to write a book review of *Human Factors and Web Development*. The review can be done is approximately five pages of double-spaced text. On the due date, students will discuss in class come what they read.

TERM PAPERS

A list of term papers topics will be handed out separately along with further instructions about how to compose it. The list will cover the full range of topics that are covered in this course, with a focus on the new challenges in the field. Students will be asked to select a topic early in course, and one of the goals of the process is to have each student cover a different topic.

The paper itself should be about 15-20 pages in length, including a full bibliographic citation of your technical references. Your material should include references to original research papers (books and especially the journals). A list of suggested journal is attached to this syllabus.

CLASS PRESENTATIONS

All students will present their term paper topics in class. The time available per presentation will depend somewhat on the number of people who are enrolled in the class. Presentations will be scheduled for the last few days of class. The schedule of presentations will be made by SJG.

ADDITIONAL for GRADUATE STUDENTS

Graduate students' term papers should be approximately 30 pages long. All the foregoing guidelines apply. In addition, the paper should provide a research plan for gathering new knowledge about the topic.

GRADES

Grades will be based on a midterm exam, a final exam, and a term paper, each worth 25% of the grade. The other 25% is associated with in-class activities, writing assignments, a book report, the web assignment, and the industry standards assignment.

Grades have traditionally been assigned in this class on a percentages basis, such that A = 85% or better, AB = 80%, B = 70%, BC = 65%, C = 60%, CD = 55%, D = 50%, F = less than 50%. The historical odds, based on past classes, of obtaining BC or better: 70%; the odds of passing the course, 99%.