

College of Information Technology & Engineering
SFT 660
Human Factors in Accident Prevention

Instructor's Name: **Dr. Allan Stern**
 212 Communications Bldg.
 696-3069
 [**Stern@marshall.edu**](mailto:Stern@marshall.edu)

My office hours are generally posted outside the safety Office. If you need to see me at any other time, please call and make an appointment.

Computer Requirements: **Ability to use Internet to conduct research.**

Pre-requisite: **None**

Text: **Normal Accidents: Living with High-Risk Technologies.**
 Perrow, Charles

Set Phasers on Stun.

**Human Factors Engineering. McCormick, Ernest J.,
McGraw-Hill Company, N.Y., N.Y. (Supplementary)**

Course Description:

A study of the psychological principles and their applications to accident causation.

Desired Learner Outcomes:

By the end of this course, the student will know the following:

1. Detailed study of designing in safety – in the job, in the machine and in the environment.
2. Review how controls and machines can be made more convenient and more comfortable and less confusing, less exasperating and less fatiguing to the user.
3. Concern the student with the interaction (or interface) between man and his machine and man and his environment.

4. Describe daily use of human factors engineering for the safety professional.
5. Define human factors engineering and explain how it relates to safety.
6. State three reasons why there is a need for Human Factors Engineering in the manufacturing industry.
7. Explain the role of OSHA in the area of Human Factors
8. State the estimated percentage of knowledge acquired through vision.
9. Distinguish between accommodation and adaptation as it relates to vision.
10. Distinguish between relative discrimination of sound and absolute discrimination of sound.
11. Define masking as it relates to sound.
12. List the three functions involved with information processing.
13. Define human time lag.
14. Define anthropometry and state how it relates to safety.
15. State three basic considerations in selecting an adequate display.
16. State the proper numerical progression when placing numbers on visual displays.
17. State three advantages of using pictorial signs and labels.
18. List three means used to identify machine controls.
19. Define the term control/response ratio.
20. State four major problems in the maintainability of equipment.
21. Give four ways to reduce glare in the work place.
22. State the advantages and disadvantages of insert-type hearing protectors and muff-type hearing protectors.

Grading Policy:

I use the standard 90%, 80%, 70% grading scale determined after all points from all assignments have been totaled at the semesters end. All examination materials will come from lectures and text materials.

Policy Statement:

This course is designed for the graduate student, safety professional working in the field. It is concerned with the proper design and construction of equipment and how best to utilize the man and machine together in an efficient manner so as to minimize errors which cause accidents. The student will or should be able to look at machines and see what is good or bad about the design and how this can cause accidents.

Attendance Policy:

I will keep track of attendance, but it is your responsibility to determine if you can miss a class or not. Since a large amount of the materials will be lecture it is to your advantage to come to class.

Assignments

- 1. Mid Term Examination**
- 2. Final Examination**
- 3. Journal** - @100 points. I want you to keep a weekly log over the course of the next semester. You can write in this log or use a computer to keep track of your observations. In this log I want you to start reflecting on the things you use in your everyday life. How are they made? How do they work? Do they work efficiently? Do they not work? Can they be improved? Do you like/dislike the design, ergonomics, aesthetics, etc.? Do this ongoing. Take the log with you as you travel. Do not wait till the last week to do this. Try and correlate the classes with what you are observing.
- 4. ClassWork** - @ 100 points. I will try to get us a couple of field trips to go out and look at some things. This is not definite.
- 5. Paper** – 100 points. I want you to form small focus groups. Possibly 4 or 5 groups depending on enrollment. From the text Normal Accidents, I would like you to pick out one of the minor accidents the author wrote about and prepare a power point presentation of what went wrong.

SFT 660
Schedule of Topics
Fall 2002

1. The Things People Use
 - 1.1 Human Factors Engineering defined
 - 1.2 A bit of background
 - 1.3 Concepts of a system
 - 1.4 Characteristics of a system
 - 1.5 Types of systems

2. Human Factors in System Development
 - 2.1 Basic processes in system development
 - 2.2 Criteria in research and system development
 - 2.3 Performance reliability
 - 2.4 Human performance
 - 2.5 Human factors data and use

3. Human Sensory Process
 - 3.1 Vision
 - 3.2 Hearing
 - 3.3 Cutaneous Senses
 - 3.4 Kinesthetic Sense
 - 3.5 Orientation Senses
 - 3.6 Perception

4. Information Input Processes (experiments for class)
 - 4.1 Information in systems
 - 4.2 Information theory
 - 4.3 Channel capacity
 - 4.4 Coding of sensory inputs
 - 4.5 Organization of information

4. Visual Displays
 - 5.1 When displays should be used
 - 5.2 Errors in the use of displays
 - 5.3 Quantitative visual displays
 - 5.4 Qualitative visual displays
 - 5.5 Displays in general

6. Auditory and Tactual Displays
 - 6.1 Auditory displays
 - 6.2 Tactual displays
7. Speech Communications
 - 7.1 Characteristics of speech
 - 7.2 Speech intelligibility
 - 7.3 Components of speech communication
 - 7.4 The message
 - 7.5 The transmission system
8. Mediation Activities
 - 8.1 Information storage – retrieval
 - 8.2 Acquisition of skills and knowledge
 - 8.3 Conditions that contribute to learning
 - 8.4 Training
 - 8.5 Compatibility
9. Human Control of Systems
 - 9.1 A theory of control
 - 9.2 Conscious processes in control functions
 - 9.3 The nature of continuous control systems
 - 9.4 Displays and Controls
 - 9.5 Compatibility of displays and controls in tracking
10. Human Motor Activities
 - 10.1 Bases of human motor activities
 - 10.2 The measurement of physical activity
 - 10.3 Energy expenditure in physical activity
 - 10.4 Biomechanics of motion
 - 10.5 Speed and accuracy of movement
11. Controls, Tools and Related Devices
 - 11.1 Identification of Controls
 - 11.2 Design aspects of specific controls
 - 11.3 Control Backlash and deadspace
 - 11.4 Response lag
 - 11.5 Tools and other devices
12. Arrangement and utilization of Physical Space