Systems Safety Engineering II
IMSE 662 - 3 credit hours
Spring Semester 2013
Wednesday 5:30 – 8:30 pm
109 MRB

Instructor: Dr. John Etherton
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Systems Safety Topics

I. System Safety and Risk Management
II. Risk Assessment
III. Products Liability
IV. Fire Protection
V. Hazardous Materials

Course Objectives and Philosophy:

The field of systems safety is a dynamic practice that changes as new technologies and products with unknown or unaddressed risks are brought into the workplace. The safety and health professional practicing at an advanced level should be comfortable with appropriate application of systems safety methodologies. In IMSE 461 Systems Safety I, the basics of some of these methodologies were introduced. In IMSE 662, more detailed experience with the selection of the appropriate methodologies and effective procedures for carrying out systems safety analyses will be addressed. There are many reasons for the value of this to advanced safety and health professionals. Some of the more prominent include the following: technological changes that have introduced new hazards in the workplace; increased pressure from regulatory agencies; realization by executives that a safe and healthy workplace is typically a more productive workplace; health care and workers' compensation costs; increased pressure from environmental groups and the public; and rapidly mounting costs associated with product safety and other types of litigation.

All of these factors, when taken together, have made the position of the modern safety and health professional more challenging and more important than it has ever been. These factors have also created a need for safety and health professionals with specialized knowledge who are adept at controlling or eliminating workplace risks. Safety and Health professionals working with Engineers can form a team of individuals, which will permit industrial and business concerns to operate efficiently, productively and to produce quality goods and services at competitive prices.

Student Learning Objectives:

Upon completion of this course students will:

a. Possess an advanced knowledge of system safety techniques.
b. Have an advanced understanding and experience of how system safety techniques and software can be applied to product safety.
c. Have an advanced understanding and experience of how system safety techniques can be applied to industrial fire prevention.

Readings
The text for this course is: "Hazard Analysis Techniques for System Safety" by Clifton A. Ericson . Electronic copies for each student of readings from various resources will also be provided at a class session before the readings will be discussed.

Homework
Homework assignments will be given as we progress through the course. Homework is due the session after it is assigned. Homework must be submitted in both hard copy and sent to the instructor (jre@saferjobs.com) as an e-mail attachment. Permission from the instructor is required for late submission of homework.

System Safety Product/Process Evaluation Report
The class will be divided into teams. Each team will develop a product/process safety evaluation of an assigned product/process. The evaluation is not to be a review of what is already being done for safety on the system/process; rather you are to identify at least one specific new administrative risk reduction measure and at least one new technical risk reduction measure. You are to provide specific calculations on how risk will be reduced. "*designsafe*" software will be made available for performing a risk assessment on the product/process.

- ✓ A poster will be prepared that 1) describes the system and any injury history relative to it, 2) gives the methods used to analyze the system, 3) shows results of the analysis, 4) makes at least two specific risk reduction recommendations that go beyond what is already being done, and 5) provides references.
- ✓ An executive report of no more than 2 pages will be written and delivered to the project sponsor at an on-site meeting before the end of the semester.

  The executive report will have at least these headings:

  Title and authors
  Problem description
  High risk areas
  Methods used for analysis
  Recommendations (with purchasing/management details) to reduce two High risks
- ✓ In class, a 5 to 7 minute in-class presentation of the evaluation will be given by the team in the last regular class session.

You will provide the electronic file on your poster/presentation to the instructor. If you would like your own copy of the poster, make extra copies for yourself. Required progress reports will be turned in as hard copy and also e-mailed to the instructor.

Fire Audit Report

Each member of the class will locate a structure on which to perform a fire audit. You will conduct your own tour of the facility, making sure to specifically see areas that pose high risk of fire (such as kitchens in restaurants).

- ✓ A report of no more than 6 pages will be written and a 5 to 7 minute in-class presentation of the evaluation will be given by the individual in the last regular class session.

Class Schedule

1/16 1 - Introduction to Course; Products Liability Risk Assessment - Introduction to *designsafe* software
1/23 2 - Products Liability Session - Film - "Hot Coffee"
1/30 3 - Building Design, Construction, Fire Barriers and OSHA Regulations and NFPA Codes
2/6 4 - Life Safety Code and Fire Investigations
2/13 5 - Fire and Smoke Behavior, Characteristics and Hazards of Fire
2/20 6 – Sprinkler and Fixed Systems; Exam 1
2/27 7 - Historical Perspective on applications of system safety
3/6 8 - Advanced Failure Modes and Effects Analysis, Advanced Fault Free Analysis and other techniques
3/13 9 – System Safety and Risk Management
3/20 10 - Exam 2; Risk Assessment
3/27 Spring Break
4/3 11 – Hazardous Materials Response
4/10 12 - Lab - Self Contained Rescues and Fire Hose Training (South Morgantown Fire Department, on Van Voohris)
4/17 13 - Risk Communication
4/24 14 – Project Presentations - Fire Audits/ Systems Safety Product Evaluation
5/1 15 – Final Exam Workers Memorial Day (4/28)

Grading

Exams 1 & 2	15% each
Final	20%
Homework	20%
Fire Audit Written Report	10%
Fire Audit Verbal Presentation	5%
S.S. Product/Process Evaluation Report	10%
S.S. Product/Process Evaluation Presentation	5%