

**INEN 5386 - Industrial and Product Safety
Course Syllabus (Spring 2008)**

Semester: Spring 2008
Location: Cherry C-2629
Lecture: M W 7:00 PM - 8:15 PM

Catalog Information (2006 - 2008): INEN 5386: Industrial and Product Safety (Credit 3). Loss control engineering. Mandatory and voluntary standards. Product liability.

Prerequisite: Graduate student standing.

Textbook: Marshall, Gilbert, 2000, *Safety Engineering*, 3rd Edition, American Society of Safety Engineers Press, Des Plaines, IL.

Reference: Brauer, R., 2006. *Safety and Health for Engineers*, 2nd Edition, John Wiley and Sons, Inc., Hoboken, NJ.
Hammer, W., 1993, *Product Safety Management and Engineering*, 2nd Edition, American Society of Safety Engineers Press, Des Plaines, IL.
Goetsch, D., 1998, *Implementing Total Safety Management*, 1st Edition, Prentice Hall, Upper Saddle River, NJ.
Asfahl, C. Ray, 1999 *Industrial Safety & Health Management*, 4th Edition, Prentice-Hall, Englewood Cliffs, NJ.
Goetsch, D. L., 2008, *Occupational Safety and Health*, 6th Edition, Prentice-Hall, Englewood Cliffs, NJ.

Geller, S., *The Psychology of Safety*, 1st Edition, Chilton Book Company, Radnor, PA
Hammer, W. and Price, D., 2001, *Occupational Safety Management and Engineering*, 5th Edition, Prentice-Hall, Englewood Cliffs, NJ.
Eckenfelder, D., 1996, *Values Driven Safety*, 1st Edition, Government Institutes, Inc., Rockville, MD
Petersen, *The OSHA Compliance Manual*, McGraw-Hill, Latest Edition.
Krieger, G. and Montgomery, J., (Eds), 1997, *Accident Prevention Manual for Business and Industry (Engineering and Technology)*, 11th Edition, National Safety Council, Itasca, IL
Krieger, G. and Montgomery, J., (Eds), 1997, *Accident Prevention Manual for Business and Industry (Administration and Programs)*, 11th Edition, National Safety Council, Itasca, IL

LaDou, J., *Occupational Health and Safety*, 2nd Edition, National Safety Council, Itasca, IL
National Safety Council, *Supervisors' Safety Manual*, 9th Edition, Itasca, IL
Bahr, N., 1997, *System Safety Engineering and Risk Assessment: A Practical Approach*, Taylor and Francis, Washington, DC
Best's Safety Directory, A. M. Best Co., Oldwick, New Jersey (Annual).
Professional Safety, ASSE, Park Ridge Illinois, (Monthly).
Bhattacharya, A and McGlothlin, 1996, *Occupational Ergonomics: Theory and Applications*, Marcel Dekker, Inc., New York, NY
Hutingson, R., 1981, *New Horizons for Human Factors in Design*, McGraw-Hill, New York, NY
Rodgers, S., 1983, *Ergonomic Design for People at Work*, Volume 1, Van Nostrand Reinhold, New York, NY
Rodgers, S., 1986, *Ergonomic Design for People at Work*, Volume 2, Van Nostrand Reinhold, New York, NY
29 CFR 1910.
29 CFR 1926.
ASTM Book of Standards, (Latest Ed.), ASTM, Philadelphia, PA.
NFPA Standards, (Latest Ed.), National Fire Protection Assn., Quincy, MA.

Coordinator: Brian N. Craig, PhD, PE, CPE, Associate Professor, Department of Industrial Engineering.

Office: 2208 Cherry Engineering Building

Phone: 880-8520 (office), 782-6989 (cell), 842-5377 (home)

Email: brian.craig@lamar.edu

Office Hours: Monday 10:00 AM - 12:00 PM, or by appointment

Goals: To provide the student with an appreciation of the social and economic impact of industrial accidents. To provide the student with general rules and checklists to help design and maintain a safe work environment. To define the role of the design engineer in industrial and product safety. To introduce the role of governmental and voluntary standards in process and product design safety.

Prerequisites

by Topic: Graduate Standing

Topics:

- Approaches to Safety
- Standards and Legislation
- Texas Workers' Compensation
- Recognition and Control of Hazards
- Work Systems, Ergonomics, and Work Related MSDs
- Personal Protective Equipment
- Walking and Standing Surfaces and Egress and Life Safety
- Fire Prevention and Suppression
- Noise and Noise Control
- Hazardous Materials and Environmental Controls
- Personnel and Promoting Safe Work Practices
- Appraising Plant Safety and Accident Investigations
- Hazards (Mechanical, Mobile Equipment, Electrical, Tools and Machine Controls, Fall Prevention, and Machine Safeguarding)

Computer Usage: MS Word, MS Excel, MS PowerPoint, Internet, other.

Engineering Design Experience: Students are required to design/redesign workplaces and jobs with respect to noise, fire prevention/protection, as well as re-designing workplaces and jobs based on fault tree analysis.

Probability and Statistics: A common approach of appraising plant/job safety is through the use of probability and severity matrices. From analyses of the probability of occurrence and severity, prioritized facility "fix-it" lists are developed.

ABET category content as estimated by the faculty member who prepared this course description:

Engineering Topics: 3 credits
Engineering Design Content: Yes

Outcomes: 1, 3, 4, 5, 6, 7, 10, 11, 12

Prepared by: Brian N. Craig, PhD, PE, CPE

Last Updated: 14 January 2008

Grading: Exam 1 - 20%
Undergrad: Exam 2 - 20%
Final Exam - 20%
Group Project - 20%
Pop Quizzes/Study Questions/Special Assignments - 20%

Grading: Exam 1 - 20%
Grad: Exam 2 - 20%
Final Exam - 20%
Group Project - 15%
Lecture - 15%
Pop Quizzes/Study Questions/Special Assignments - 10%

MAKE UP EXAMS: If you miss an exam, it counts as a ZERO. Only in the case of a UNIVERSITY APPROVED EXCUSE will the final exam grade replace the missed exam grade.

Computer Usage: MS Word, MS Excel, MS PowerPoint, Internet, other.

EMAIL: *Much of the communications will be performed via email.*

Class Notes: MOST (NOT all) class notes will be made available through the Lamar server. I will email the class a link that you just need to click on to download the notes off the server. *Due to limited server space, the notes will be available for a limited time on the server. If you do not download the notes, it is YOUR responsibility to get them from a class mate or my teaching assistant.*

*****There will NOT be any exceptions*****

Students are expected to take notes during class even if notes for a particular chapter are provided, since course discussions will extend beyond the contents of the notes provided.

Required Reading: Read assigned chapters and additional materials (if any) before attending class

Study Questions: Study questions to supplement the required reading will be assigned and *shall be completed and turned in by the beginning of class on the date they are due.*

Pop Quizzes: We will have quizzes throughout the semester based on the required reading.

Special Assignment: Obtain copies (PDF format or order your own copy) of the following materials from the OSHA and NIOSH Publication web sites (this work is NOT for extra credit and each publication values a full quiz/question grade):

From <http://www.osha.gov/> order:

1. NEW OSHA WORKPLACE POSTER - Publication 3165
2. OSHA 300 (Log of Work-Related Injuries and Illnesses) and 300A (Summary of Work-Related Injuries and Illnesses) forms
3. HOW TO PREPARE FOR WORKPLACE EMERGENCIES - Publication 3088

From <http://www.cdc.gov/niosh/homepage.html> order:

1. 97-141: Musculoskeletal Disorders and Workplace Factors: A Critical Review of Epidemiologic Evidence for Work-Related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back
2. 97-117: ELEMENTS OF ERGONOMICS PROGRAMS: A PRIMER BASED ON WORKPLACE EVALUATIONS OF MUSCULOSKELETAL DISORDERS

THESE PUBLICATIONS MUST BE SHOWN TO ME BY THE END OF MARCH 2008

Oral Group Project (ALL): Each group (2 - 3 students) will provide me with a formal topic proposal, will research the topic, present the topic to the class (15 - 20 minutes), and create a formal write up on the topic (approved by me) related to industrial safety, product safety, and/or ergonomics. I am generally looking for program development, product design improvement, or case studies. The topics may include:

- What is total safety management?
- Respiratory fit testing protocol
- What is behavioral based safety?
- Examples of good/poor industrial/product safety design
- Etc.....

EACH GROUP MEMBER IS EXPECTED BE ACCESSIBLE TO THE OTHER GROUP MEMBER(S) AND TO PERFORM AN EQUAL AMOUNT OF WORK IN ALL ASPECTS OF THIS PROJECT

EACH GROUP MEMBER WILL EVALUATE EACH MEMBER OF THE GROUP (INCLUDING YOURSELF)

Written Group Project (ALL): Outcome H, I, J Essay

Topic: BP Texas City Refinery Explosion (March 2005)

Assignment:

1. To be completed in groups of 2 - 3 (to be assigned)
2. Read related materials from an online literature search
3. Write an essay that:
 - a) Identifies issues for the company, employees, governmental agencies, safety profession, legal profession, and customers, etc. Demonstrate your understanding of the issues.
 - b) Identifies strategies to prevent, overcome, and deal with the issues including the impact of these strategies in global, economic, environmental, and societal contexts.
 - c) Describes how life-long learning would assist involved persons in creating and executing specified strategies. (Life-long learning may include graduate school,

continuing education, licensing, certifications, attending conferences, becoming members of professional societies and other learning opportunities.)

EACH GROUP MEMBER IS EXPECTED BE ACCESSIBLE TO THE OTHER GROUP MEMBER(S) AND TO PERFORM AN EQUAL AMOUNT OF WORK IN ALL ASPECTS OF THIS PROJECT

EACH GROUP MEMBER WILL EVALUATE EACH MEMBER OF THE GROUP (INCLUDING YOURSELF)

Lectures: A group of 2 - 3 graduate students will prepare a full class
(Grad ONLY) lecture covering an approved (by me) topic off the syllabus.

Each group will present the material to the class and provide all handouts (hardcopy, diskette, and/or email) to the class. Each student must present and provide me with all notes and lecture materials preferably in electronic format.

EACH GROUP MEMBER IS EXPECTED BE ACCESSIBLE TO THE OTHER GROUP MEMBER(S) AND TO PERFORM AN EQUAL AMOUNT OF WORK IN ALL ASPECTS OF THIS PROJECT

EACH GROUP MEMBER WILL EVALUATE EACH MEMBER OF THE GROUP (INCLUDING YOURSELF)

Web Site Search: To improve your pop quiz/study question/special assignment score. Locate web sites related to industrial safety, product safety, system safety, and/or ergonomics. If all five unique sites are submitted by the due date, I will add one more full credit quiz grade to your quiz/study question/special assignment average (meaning , in theory, you could make over 100% for this group of grades) Each site can only be submitted ONCE, so if it has already been submitted, you will not get credit. Email the sites to me for credit.

THESE WEBSITES MUST BE SHOWN TO ME BY THE END OF MARCH 2008

******* ALL ASSIGNMENTS ARE DUE AT THE BEGINNING OF CLASS*******

LATE WORK WILL NOT BE ACCEPTED

PLEASE TURN OFF ALL CELL PHONES AND PAGERS PRIOR TO ENTERING CLASS

Detailed Syllabus

Class #	Day	Date	Planned Topic
1	M	14-Jan	Introductions and Syllabus
2	W	16-Jan	Approaches to Safety
3	M	21-Jan	NO Class - Holiday
4	W	23-Jan	Standards and Legislation (Handout on Proposal Preparation, Handout on Formal Write-ups, Handout on Oral Reports/Lectures, Assign Group Project Members, Assign Lecture Team Members)
5	M	28-Jan	Recognition and Control of Hazards
6	W	30-Jan	Work Systems, Ergonomics, and Work-Related MSDSs
7	M	4-Feb	Walking and Standing Surfaces
8	W	6-Feb	Personal Protective Equipment
9	M	11-Feb	Texas Department of Insurance - Division of Workers Compensation - Ms. Carly Phillips (date tentative)
10	W	13-Feb	Fire prevention and Suppression - Grad Students
11	M	18-Feb	Egress and Life Safety - Grad Students, Group Presentation Proposals DUE
12	W	20-Feb	EXAM 1 (Dr. Craig in AVI)
13	M	25-Feb	BBS, Mobile Equipment, Fall, and Respiratory videos (Dr. Craig in AVI)
14	W	27-Feb	Environmental Controls (Dr. Craig in AVI)
15	M	3-Mar	Noise and Noise Control - Grad Students
16	W	5-Mar	Hazardous Materials - Grad Students
17	M	10-Mar	Spring Break
18	W	12-Mar	Spring Break
19	M	17-Mar	Personnel and Promoting Safe Work Practices
20	W	19-Mar	Appraising Plant Safety
21	M	24-Mar	Accident Investigations (Dr. Craig in San Antonio???)
22	W	26-Mar	Exam 2 (Dr. Craig in San Antonio)
23	M	31-Mar	Mechanical Hazards
24	W	2-Apr	Mobile Equipment
25	M	7-Apr	Electrical Hazards
26	W	9-Apr	Tools and Machine Controls
27	M	14-Apr	Principles of Risk and Machine Safeguarding
28	W	16-Apr	Group Presentations
29	M	21-Apr	Group Presentations
30	W	23-Apr	Group Presentations
31	M	28-Apr	Group Presentations (BP Explosion Review Due)
32	W	30-Apr	Finals Week - NO Class
33	M	5-May	Final Exam (8:00 PM - 10:30 PM (8:00 - 9:15))

Important Dates:

- January 21st, March 10th - 14th, March 21st - No class
- February 22nd - last day to drop or withdraw and still receive a Q/W, even if failing a course OR to petition for a no grade (NG).
- April 11th - last day to drop or withdraw for the semester.
- April 3rd - Graduate written comprehensive exams
- April 7th - April 30th - Graduate oral exams/thesis defenses
- March 3rd - Deadline for *graduate students* to apply for graduation (students should apply as soon as possible)
- April 1st - Deadline for *undergraduate students* to apply for graduation (students should apply as soon as possible)
- May 5th - Final Exam

UNIVERSITY POLICIES

ATTENDANCE AND DROP POLICY:

Students are required to read and be prepared to discuss the assigned textbook chapters workbook exercises before attending the class session in which they will be discussed.

Class attendance and lateness policies will be discussed during the first week of class. Those policies include by reference all provision for grade adjustment or drop policies included in the applicable Graduate or Undergraduate Catalog in effect at the start of the semester.

NO STUDENT WILL BE DROPPED FROM THE CLASS ROLLS

FOR NEVER ATTENDING OR EXCESSIVE ABSENCES.

A student dropping a course after the Census Date but on or before the appropriate final drop date will receive a grade of "W" *only* if at the time of dropping, the student is passing the course (has a grade of A, B, C, or D); otherwise an F will be received.

Absences Based on Religious Beliefs:

A student who misses an examination, work assignment, or other project due to the observance of a religious holy day will be given the opportunity to complete the work missed within 15 days following the due date of the assignment, test, or other project missed. To be eligible for such a make-up, the student must notify me in writing of classes scheduled on dates he or she will be absent to observe a religious holy day. Notification must be made within the first 15 (fifteen) class days through either a written correspondence, personal delivered, acknowledged and dated by me or written correspondence sent certified mail, return receipt requested to me. Failure to follow the rules provided above within the time frames listed will result in the absence being considered unexcused.

AMERICANS WITH DISABILITIES ACT (ADA):

Lamar University is on record as being committed to both the spirit and letter of the ADA to make reasonable adjustments in the classroom necessary to eliminate discrimination on the basis of disability. Students should meet with the Instructor during the first week of class to discuss their special needs and advise the instructor of any special needs, abilities or limitations and to discuss the

instructor's expectations in class participation, performance and work standards. Any disclosure by the students of their need for accommodations is recognized to be extremely sensitive and all conversations and other communications will be kept protected and confidential and disclosed on a need-to-know basis only.

Students are responsible for contacting and consulting with the University's Office for Students with Disabilities prior to contacting the instructor about any disabilities. The student should provide the instructor with some form of written documentation of the disability from an acceptable, external sources (such as a doctor, psychiatrist, etc.) and from the Office for Students with Disabilities.

ACADEMIC DISHONESTY:

All students are expected to pursue their scholastic careers with honesty and integrity.

It is the philosophy of this Department, this instructor, and Lamar University that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

"Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission of credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, or any act designed to give unfair advantage to a student or the attempt to commit such acts."

MAKE UP EXAMS: If you miss an exam, it counts as a ZERO. Only in the case of an APPROVED EXCUSE will the final exam grade replace the missed exam grade.

ATTENDANCE & PARTICIPATION:

I encourage you to participate in class discussions and attend class regularly. The more you participate on a regular basis, the more you will gain from this course. Effective participation requires good preparation therefore I absolutely encourage you to read the material before class.