ME EN 5110/6110 – *INTRODUCTION TO INDUSTRIAL SAFETY*

University of Utah
Department of Mechanical Engineering / Ergonomics & Safety Program
Lecture: Monday 6:00-9:00 PM
Location: WEB L103 (Tentative)

COURSE INSTRUCTOR: Kenneth L. d'Entremont, Ph.D., P.E.

Phone: +1-801-581-6766 Office
Email: k.dentremont@utah.edu
Office: MEB 2105 [***Merrill***, not Rio Tinto Kennecott]

FORMAT: *Hybrid*; course presented in-person, via Zoom, and lectures videos will be posted in Canvas https://utah.zoom.us/j/95780220043
Students are encouraged to attend in-person unless health or other valid concerns prevent it.
All examinations are to be taken in-person.

CREDITS: 3 semester credit hours

LECTURERS: Guest lecturers include representatives of the Utah Workers Compensation Fund, Utah OSHA, medical, industrial-safety and/or transportation professionals, and others.

TEXTBOOK: *Occupational Safety Management and Engineering, 5th ed.* Willie Hammer & Dennis Price, Prentice Hall, NY, USA, 2001. (ISBN 0-13-896515-3) The Fourth edition does not contain all of the material to be covered this semester.

OTHER READING: OSHA publications, journal articles, and other relevant material will be made available to supplement the textbook as needed. This additional material will be available either at a listed website or uploaded to Canvas in an appropriate folder.

Lecturers' PowerPoint presentations will be made available after class (unless stated otherwise) in PDF format, labeled with the content material, and located in the appropriate Canvas folder.

OFFICE HOURS:

Instructor:	Monday	4-6 PM in person and via Zoom (https://utah.zoom.us/j/99956558203)
	Thursday	1-3 PM via Zoom (https://utah.zoom.us/j/93872776742)
	Instructor also available after class, drop by (afternoons are best), and by appointment.	
Grader:	[To Be Announced] will be your grader (*****@utah.edu)	

Questions on grading of HW and quiz questions ***must*** first go to the Grader. If the issue is not resolved, see the instructor. The Grader will not hold office hours, so please contact him by email to set up a time to discus HW and quizzes if necessary. See the instructor if you have questions relating to the course.

COURSE DESCRIPTION: This course is an introduction to modern hazard control in industrial environments. This course covers the operation of industrial safety and health program management as well as the requirements of the OSHA Act and the workers compensation system. The principles of safety engineering will be applied to the recognition and control of physical hazards in work environments. Students will learn how to identify and assess workplace hazards, reference applicable safety standards, and eliminate or minimize hazards to an acceptable level.

Experimental or timely sections of material relevant to Industrial Safety will be added to the curriculum at the instructor's discretion.

COURSE OBJECTIVES:

Upon completion of this course, students will:

1. Develop an understanding of OSHA standards, particularly *29 CFR 1910: General Industry Standards*
2. Be familiar with major OSHA required safety and health programs
3. Recognize and evaluate sources of illnesses and injuries through analysis of incidence and severity measures
4. Understand the effect of physical and chemical hazards on workers in adverse environments
5. Have a basic understanding of the workers' compensation process
6. Understand the responsibility of engineers and other professionals in product and process design with regard to professional liability and ethics
7. Be able to perform a basic accident investigation and recommend corrective actions.
8. Be able to specify appropriate machine guards and devices or evaluate the effectiveness of existing machine guards and devices
9. Be able to develop a general Lock Out/Tag Out or Confined-Space Entry program.
10. Be able to perform a basic safety audit of workplace and suggest corrective measures for electrical, fire, mechanical, noise, and other workplace hazards
11. Be able to design warnings for hazardous machines
12. Be able to construct training materials suitable for an industrial work environment
13. Understand the difference between simple compliance and risk-based Safety (and Health)
14. Use critical thinking when necessary

EVALUATION OF STUDENT PERFORMANCE—FOR ME EN 5110 & ME EN 6110:

Midterm (Exam 1)	100	Points
Final Exam (Exam 2)	100	
Academic-Integrity Module	4	
Semester-Project Report	100	All students
Homework (7×20 pts)	140	
TOTAL	444	Points
Semester-Project Presentation	100	Only graduate students (ME EN 6110)
TOTAL	544	

Both undergraduate and graduate students will be graded on the same scale.

Graduate students are permitted to earn more points than undergraduate students (see Graduate-Student notes below). However, grading will be on a ***percentage*** basis. Therefore, a difference in total-point possibilities will NOT matter.

Final-grade assignments ***will not be stricter*** than the straight scale (see below). The instructor reserves the option of grading via curve *upward*—i.e., beneficial to students.

A	94+
A-	90+
B+	87+
B	84+
B-	80+
C+	77+
C	74+
C-	70+
D+	67+
D	64+
D-	60+
E	Lower

ACADEMIC INTEGRITY: In accordance with Department of Mechanical Engineering policy, all students must complete the *ME EN Academic Integrity* Module in Canvas regardless of program or department of enrollment. A short quiz at the end of the module must be completed with a *passing* score. Five (5) points are awarded for this.

EXAMS: There will be two (2) exams given each worth 100 points. Exams are open book, open laptop, open notes, open homework, open quizzes. Any course notes or material handed out in class may be brought to class. Do not bring other outside reference material. The exams will cover all text/handout material and all material/information discussed in class unless the instructor specifically notes that the material will not be on the exam. Exam material includes, for example, answers to class questions, guest lectures, etc. (Read *Electronic-Equipment Use* section below.)

The instructor will grade all exams.

The ***Final Exam*** will be ***non***-comprehensive and
cover ***only*** the material discussed ***since*** the mid-term exam.

HOMEWORK: There will be seven (7) homework assignments each worth 20 points. Homework will be assigned on dates according to the syllabus and will be due per the assignment document. Students will work on assignments individually (unless otherwise permitted).

Assignments:

- Must be submitted through Canvas
- Must be in PDF format

Homework Re-Submission Policy

- HW due at date/time specified
- Students may correct and re-submit homework assignments within one week after the HW has been returned
- 80% credit of the new score will be used for HW grade
- Student can only re-submit HW once

SEMESTER PROJECTS: Details on the subject of the project will be forthcoming, but it should involve and include elements of Industrial Safety—but is not required to focus specifically on this topic. The instructor is open to latitude on topics. There will be a chance to propose and outline the project topic before starting work on the project.

GRADING: The Grader will grade all homework assignments. Questions on homework and quiz grading should first be discussed with the Grader before speaking with the instructor.

POSTING OF SCORES: All scores will be posted via Canvas. Please check to be sure your scores are correct throughout the semester. The earlier an error is detected, the easier that error will be to correct.

FOR DISTANCE-LEARNING STUDENTS (ME EN 6110—*SECTION 030 ONLY*): Arrangements will be made to provide access to lectures the day after they are given. The administration of this class (especially examinations) will be coordinated through NG's on-site course supervisor. Distance-Learning students will be informed of the details of these arrangements as these dates approach.

Homework should be e-mailed directly to the grader at the address shown earlier. Since Distance-Learning students are receiving the assignment one day later than the in-classroom students are, Distance-Learning students are given two extra days before assignments are due.

Students in Section 030 will be required to present their group's project in person at MEK 3550 during the normally scheduled lecture on April 25. Consult with the instructor if this scheduling presents a problem for the group.

Classroom Vision

It is hoped that these lecture periods will be a place for open and honest discussion about this important topic

- Critical thinking is encouraged—if not demanded
- This is a ***fault-tolerant*** environment
- No one will make more mistakes than the professor!
- Let us all learn together!
- Let me know if you need anything!

OTHER IMPORTANT INFORMATION

UNIVERSITY POLICIES

COVID-19 INFORMATION: Be sure to stay up to date with University COVID procedures and policies at their website: https://coronavirus.utah.edu/

ADA Statement
The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability and Access, 162 Olpin Union Building, (801) 581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

University Safety Statement. The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-

COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit https://safeu.utah.edu/

Addressing Sexual Misconduct. Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Undocumented Student Support Statement. Immigration is a complex phenomenon with broad impact—those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit dream.utah.edu.

Wellness Statement. Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural difference, etc. can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

Accommodation: Students needing accommodations for class are urged to work with the Center for Disability and Access (CDA) whose webpage is https://disability.utah.edu/students/accomodations-services.php

For Drop/Withdrawal dates and any other helpful University related information, please contact your Academic Advisor.

COLLEGE OF ENGINEERING SEMESTER GUIDELINES:

https://www.coe.utah.edu/semester-guidelines

These guidelines contain important dates regarding adding, dropping and withdrawing from classes as well as the College Policy regarding repeating courses.

EXTRA-CREDIT POLICY: No extra credit is available for this course.

ANNOUNCEMENTS: Please be sure that the email you have listed at UU is *an email you actually check* in case class announcements are sent out via email.

ELECTRONIC-EQUIPMENT FAILURE: Students are responsible for maintaining and having workable electronic equipment for assignments and examinations. Equipment failure is not an acceptable excuse for late or missing assignments or for poor exam performance.

ELECTRONIC-EQUIPMENT USE: Students are permitted to use electronic devices during examinations. These electronic devices are limited to laptop computers, tablets, and smart phones (phablets) if needed. ***There can be no communications during examinations including, but not limited to, google-type searches, e-mails, texts, etc. Headphones/earphones are not permitted during lectures, quizzes, and examinations.*** Please ask the instructor if you have any questions about devices or policies.

FACULTY & STUDENT RESPONSIBILITIES: All students are expected to maintain professional behavior in the classroom setting according to the Student Code spelled out in the Student Handbook (http://registrar.utah.edu/handbook/index.php). Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating, plagiarism, and or/collusion, as well as fraud, theft, etc. Students should read the Code carefully and know that they are responsible for knowing and following the content therein. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student-Behavior Committee.
(http://regulations.utah.edu/academics/6-400.php)

Please contact the instructor if you have any additional needs.

COURSE SCHEDULE
ME EN 5110/6110 *INTRODUCTION TO INDUSTRIAL SAFETY*, Spring 2022
Below
Guest-lecturer availability may necessitate schedule changes

ME EN 5110/6110 -- Industrial Safety
Spring 2022
Prof. K.L. d'Entremont
Revision 0: 01/09/2022

Week	Date	Chapter†	Topics	Homework (Due)
1	01/10/22	Intro	Course Introduction and Syllabus	
		1	Accident Losses	
		2	Liabilities & Safety Legislation	
		3	Workers' Compensation	
2	01/17/22	--	**MLK, Jr. Day -- No Class** Reading: *****	Module: Academic Integrity + Quiz Reading: * OSHA Job-Hazard Analysis (OSHA Publication 3071)
3	01/24/22	3	Workers' Compensation (cont'd)	--
		4	OSHAct	
4	01/31/22		Utah Occupational Safety & Health (UOSH) **[Mr. Jerry Parkstone]**	--
		5	Standards, Codes, and Other Safety Documents	
		6	Engineers and Safety	
		7	Management and Its Responsibilities	
			Supplement: Job-Hazard Analysis (JHA)	
		9	Personnel	
5	02/07/22	8	Changing Roles of Safety Personnel	HW 1: Job-Hazard Analysis (JHA)
		10	Promoting Safe Practices	
		11	Appraising Plant Safety	
		12	Hazards and Their Control	
			Supplement: Warnings	
		13	Planning for Emergencies	
		14	Accident Investigation	
6	02/14/22	15	Safety Analysis	HW 2: Accident Investigation
			Supplement: Safety Hierarchy & Safeguarding	
		16	Acceleration, Falls, Falling Objects, and Other Impacts	
		17	Mechanical Injuries	
			Supplement: Machine Guarding	
7	02/21/22	--	**Presidents' Day -- No Class**	Reading: * Triodyne: Machine-Guarding posters: -Punch Press -Press Brake
8	02/28/22	**Exam 1**	**Midterm Exam** 6:00-8:00 PM in the same classroom **All Section 001 students to take exam *in-person***	HW 3: Machine Guarding & Safety Analysis
9	03/07/22	--	**Spring Break -- No Class**	
10	03/14/22		Worker-Compensation Insurance **[Ms. Katie Whited/WCF]**	
		19	Heat and Temperature	
		20	Pressure Hazards	
		21	Electrical Hazards	
11	03/21/22	26	Confined Spaces **[Prof. Donald Bloswick]**	HW 4: Electrical Hazards
		18	Work-Related Musculo-Skeletal Disorders (WRMSDs)	
		12	Lock-Out/Tag-Out (LO/TO)	
			Supplement: Lock-Out/Tag-Out (LO/TO) Video	
12	03/28/22	22	Fire & Fire Suppression	HW 5: Lockout/Tagout (LO/TO)
		23	Explosions & Explosives (+ ATEX)	
13	04/04/22		OSH Program Management **[Prof. Dan Hair, RMCOEH/WCF (ret)]**	--
		24	Hazards of Toxic Materials	
			Supplement: Training Materials	
		25	Environments	
14	04/11/22		Opioids in the Workplace **[Prof. Melissa Cheng, M.D.]**	HW 6: Hazardous Materials
		28	Vibration & Noise	
			Supplement: TBD	
15	04/18/22		Effects of Cardio. Disease and Other Factors **[Prof. Kurt Hegmann, M.D.]**	HW 7: Noise/Vibration
		27	Radiation	
16	04/25/22		Graduate Presentations (ME EN 6110 Sections 001 & 030) ***in-person***	*Study for Final Exam*
			Supplement: TBD	
		29	Computers & Safety	
17	05/02/22	**Exam 2**	**Final Exam (Non-comprehensive)** 6:00-8:00 PM in the same classroom **All Section 001 students to take exam *in-person***	

† Hammer, W. and D. Price. *Occupational Safety Management and Engineering.* Fifth Edition. Prentice-Hall, New Jersey, USA, 2001.

	No Class
	Examination
	Guest Lecturer
	Supplemental Material to textbook
	Graduate Presentations