ISE 541: Occupational Safety Engineering

Spring 2026

Fridays 1:30-4:15 pm, 4134 Fitts-Woolard Hall

Instructor: Xu Xu, Ph.D.
Office: 4351 Fitts-Woolard Hall
Office Hours: Friday: 11:00-12:15 pm for on campus students, or by appointment for EOL students
Email: xxu@ncsu.edu

Attendance Policy:

On-campus students are expected to attend class, while EOL students should watch the lecture videos. Please note that some learning material discussed during lecture may not be presented in the textbook. Each lecture will be recorded and made available to everyone. Failure to attend class / watch class video may limit your performance on assignments and, ultimately, your final grade. Attendance may be taken periodically throughout the semester. Although absences will not directly reduce your final grade, attending class can earn you extra credit (see the grade distribution below).

Course Description:

This course aims to equip students with a comprehensive understanding of workplace safety, emphasizing the importance of creating a safe and healthy environment for all workers. It covers the fundamentals of occupational safety, including safety regulations and control methods, and provides a working knowledge of occupational safety and health standards. Through case studies, classroom interaction, and real-world examples, students will develop problem-solving skills essential for identifying and eliminating potential hazards during the design and engineering phases of new products or facilities. Additionally, the course introduces various online resources to help address safety issues in the workplace.

Learning outcomes:

The learning outcomes of this course are: 1) Students will be able to articulate foundational concepts and principles of occupational safety and apply practical control methods effectively. 2) Students will be able to identify and interpret occupational safety and health standards and demonstrate an understanding of the necessary program requirements for compliance. 3) Students will be able to apply problem-solving skills by analyzing case studies, engaging in interactive classroom discussions, and addressing real-world workplace scenarios.

Textbook:

Goetsch, D. L. (2018). Occupational Safety and Health for Technologists, Engineers, and Managers. Pearson Education.

Assignments:

Textbook Reading Assignments:

Textbook chapters will be assigned in advance of classes covering the similar material. This will serve to reinforce your knowledge of the course material.

Case studies and reports:
Starting in Week 3, on-campus students will lead weekly case studies. Please use the following link to select ONE topic in occupational safety:
https://docs.google.com/spreadsheets/d/17ELeJk6QGa5IR6TXw_Bo-dc4iM9DOOWMPgkU89-DPho/
Each topic can be chosen by up to two students. If a topic already has two students, you will need to choose another topic. If you do not select a topic by **1/23**, one will be assigned to you.

You have the flexibility to choose your case content as long as it meets the following criteria: it must focus on a **single case**, align with the assigned safety topic, and involve an accident or disaster that occurred **in or after 2006**. The presentation should follow the QQTP structure, which stands for Question, Quotation, and Talking Points. Detailed guidance on this structure can be found here:
https://reinertcenter.com/2013/07/31/fostering-classroom-discussion/
Your in-class presentation should be approximately 20 minutes long and should include a thorough exploration of the case, followed by a 5 to 10-minute Q&A session. Along with the presentation, you are required to summarize your case study in a **one-page report** formatted in font size 11 and single-spaced. The presentation will be graded on a 100-point scale and the report will be graded on a 50-point scale. Please submit your presentation slides as a PDF file and your summary as a Word document within 24 hours of your presentation via the class Moodle site.

For EOL students, you need to select one topic from the Google Doc link provided above, ensuring that each topic is chosen by only one student. Because current distance learning technology does not allow for live interaction between online students and the classroom, you are required to record your presentation instead. The recorded presentation should adhere to the QQTP structure and be approximately 20 minutes long. Submit your recorded presentation and the one-page report to the class Moodle site. Tools such as PowerPoint or Zoom may be used for recording your presentation.

Exams:
The course includes three 75-minute, closed-book term exams. For each exam, students may bring one double-sided 8.5″ × 11″ sheet of notes and use any type of calculator. Exams will primarily assess material covered since the previous exam and will be graded on a 100-point scale. EOL students may take each exam no earlier than two business days before the scheduled on-campus exam date. For example, if an exam is scheduled for Friday, February 13, EOL students may take the exam beginning on Wednesday, February 11; Thursday, February 12; or Friday, February 13.

Make-up exams will only be allowed for valid reasons, such as a medical excuse, family emergency, or jury duty, as specified in the university's attendance regulations: https://policies.ncsu.edu/regulation/reg-02-20-03-attendance-regulations/

Complete the case study, assignments and exams independently. We utilize tools to detect both plagiarism and text generated by AI, including ChatGPT and Gemini.

Your grades will be posted on Moodle. If you notice a grading error, please notify within one week of when the grades are made available. After this period, grades will not be reviewed.

Communications:

In addition to attending the office hour, you can reach me via email. Be sure to include "[ISE 541]" in the subject line to ensure your email receives prompt attention.

Grade Determination:

Your final grade will be based on your performance in the course exams and problem sets. Each assignment contributes a portion to your final grade (see below). Grades will be calculated by summing the points earned on each assignment and dividing by the total achievable points. Grades will be assigned based on a standard scale, including "+" and "-". An average between 97.5-100% will be assigned a grade of "A+", an average between 92.5% and 97.4% will be assigned a grade of "A", an average of 89.5-92.4% will be assigned an "A-", an average between 87.5-89.4% will be assigned a "B+", etc.

Assignment:	**Total Points for Assignments**	**Approximate Percentage of Grade**
Exams (100 points each)	300	67%
Case study presentation	100	22%
Case study report	50	11%
Attendance (Extra Credit)	Up to 25pts	-
Total:	450	100%

Due Date Policy and Late Assignments:

All assignments must be submitted by the due dates outlined in the course schedule. Late assignments will incur a deduction of 25 points for each lecture session beyond the due date.

Auditing.

As all exams and case studies are essential to the learning experience, auditing of this course will not be permitted.

Academic Integrity Policy:

Students are expected to adhere to the university's academic integrity policy, as outlined in the Code of Student Conduct. For more information, refer to:
http://policies.ncsu.edu/policy/pol-11-35-01

Accommodation for Disabilities:

Reasonable accommodation will be provided for students with verifiable disabilities. To access these accommodations, students must register with the Disability Services Office at http://www.ncsu.edu/dso. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at: http://policies.ncsu.edu/regulation/reg-02-20-01.

General Course Policies:

(1) Computers are allowed in class only for studying course materials or completing in-class exercises.
(2) The use of cell phones during class is prohibited.
(3) You can eat light snacks and drink during the class, but messy, noisy, and strong-smelling foods are not permitted.

Class Evaluation:

Class evaluations will be available during the final two weeks of this semester. You will receive an email with a link to the evaluation site, where you can log in using your Unity ID to complete the evaluations. All evaluations are confidential. For more information about ClassEval, visit: https://isa.ncsu.edu/for-the-pack/classeval/

Course Schedule:

Week	Date	Topics to be Covered:	Reading Assignment	Student-led case study
1	1/16	Safety History The role of state government in occupational safety (watch the video by Dr. Lin)	Chapter 6	-
2	1/23	Machine Guarding Quantifying slip hazard in the field (by Mr. Maynard)	14	-
3	1/30	Slips, Trips, & Falls	15	Machine Guarding
4	2/6	Personal Protective Equipment	15, 20	Slips, Trips, & Falls
5	2/13	**Exam 1** 1:30-2:45p		
6	2/20	Thermal Stress Confined Space	16, 20	Personal Protective Equipment Quantifying slip hazard in the field
7	2/27	Electrical Safety	18	Thermal Stress Confined Space
8	3/6	Fire Protection	19	Electrical Safety
9	3/13	**Spring Break (No class)**		
10	3/20	Toxic and flammable materials	19, 20	Fire Protection
11	3/27	Ventilation Systems	20	Toxic and flammable materials
12	4/3	**Exam 2** 1:30-2:45p		
13	4/10	Radiation	21	Ventilation Systems
14	4/17	Noise	22	Radiation
15	4/24	Hazard Recognition Hazard Communication		Noise
Exam wk.	5/1	**Exam 3** noon-1:15pm		