

**Occupational Safety Engineering**  
EIN 6216 / EIN4216  
**Class Periods:** M,W,F 4:05-4:55 pm  
**Location:** TURL011  
**Academic Term:** Fall 2023

***Instructor:***

Name: Boyi Hu

Email Address: boyihu@ise.ufl.edu

Office Phone Number: 352-294-7701

Office Hours (tentative) M and W 3-4 pm, or by appointment.

***Teaching Assistants:***

Please contact through the Canvas website

- Mustafa Ozkan Yerebakan

***Course Description***

You have probably heard phrases like an OSHA violation, worker's compensation, something not being up to code, or the million-dollar lawsuits that are filed after a workplace accident that was caused by the employer's negligence. Worker safety is an integral part of thousands of businesses in the United States and the development of the current safety standards that we have did not come about in a single year or even a single decade. Although you might have a surface level knowledge of worker safety in some respects you might find yourself asking the following questions: What does it mean when something is an "OSHA violation" and how do they get identified? How did these regulations come to be in the first place? What is the process of? In this 3-credit course, we are going to answer these questions and more giving you an in-depth about workers' safety. Some of the topics we will cover in this class include safety history, accident causation, different safety organizations and agencies, approaches to occupational safety and risk management, product liability, hazard communication standards, workers' compensation, OSHA safety standards, codes, and record keeping and common occupational hazards. We will also learn more about the occupational safety hazards that are caused by emerging technologies such as robotics and the safety standards that are associated with them. By the end of this class, my hope is to equip you with the knowledge to tackle worker safety issues in whatever position you might occupy and advocate for safety in your respective workplaces.

***Course Pre-Requisites / Co-Requisites***

With instructor permission.

***Course Objectives***

To develop:

- (1) a familiarity with safety and historical litigation;
- (2) knowledge of the pillars of occupational safety and methods for application;
- (3) an understanding of product safety programs and risk management, learn how to design a simple safety program;
- (4) knowledge of hazard communication methods;
- (5) a familiarity with OSHA standards and codes and recordkeeping, knowledge of how to conduct OSHA recordkeeping;
- (6) knowledge of human behavior as related to safety;
- (7) knowledge on industrial hazards and related safety standards;

- (8) familiarity with safety activities related to accidents;
- (9) quantitative accident analysis methods;
- (10) familiarity with literature in occupational safety field;
- (11) learn the new trend in occupational safety and emerging methods.

**Materials and Supply Fees**

N/A

**Course Schedule (tentative)**

<b>Week:</b>	<b>Lecturer:</b>	<b>Brauer (2016) Reading and Assignments:</b>	<b>Tentative Topics:</b>
1 (8/21-8/27) Wednesday and Friday 4:05-4:50	Boyi Hu	Chapter 1 Extra reading materials prepared by the instructor	- Introduction and definitions; Injury statistics; History of safety; Safety organizations (professional and certification); Pillars of safety - Tragic workplace accidents
2 (8/28-9/3) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Chapters 2 and 3 Extra reading materials prepared by the instructor	
3 (9/4-9/10) Wednesday and Friday 4:05-4:50 ( <b>Monday Holiday</b> )	Boyi Hu	Chapters 4 and 25 Extra reading materials prepared by the instructor	- Ventilation safety - Accident causation and statistics; Safety agencies (OSHA, DOL) - Approaches to occupational safety and hygiene; Job safety analysis; Risk management; Risk communication
4 (9/11-9/17) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Chapters 4 and 25 Extra reading materials prepared by the instructor	
5 (9/18-9/24) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Chapter 8  Extra reading materials prepared by the instructor	- OSHA record keeping – Reporting requirements; Logs; Incident rates; Exceptions; Examples - <b>EXAM 1</b>

6 (9/25-10/1) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Chapter 11  Extra reading materials prepared by the instructor	- Falls (same level, fall to a lower level) - Fall Hazards and Protection – Types of falls; Causes; Regulations; Walking surfaces measurement; Holes/openings; Guardrails; Stairways; Portable and fixed ladder safety; Fall protection systems; Swing protection; Scaffolding
7 (10/2-10/8) Monday, Wednesday 4:05-4:50 <b>(Friday holiday)</b>	Boyi Hu	Chapter 11  Extra reading materials prepared by the instructor	
8 (10/9-10/15) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Extra reading materials prepared by the instructor	- Confined space
9 (10/16- 10/22) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Chapter 5  Extra reading materials prepared by the instructor.	- OSHA Act – General Duty Clause; Standards development; Variances; OSHA reporting; Inspections and citations; Examples; Enhanced Enforcement Policy; Appeals and contests; Employer/Employee rights; - Safety standards and codes – General Industry and subparts; Maritime and long shoring; Construction and subparts
10 (10/23- 10/29) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Chapter 16  Extra reading materials prepared by the instructor.	- Fire protection – Example incidents; Common myths; Burn classifications; NFPA diamond; Fire triangle; Fire behavior; Fire prevention; Fire load; Vapor volume; Fire classification; Extinguishers; Alarms and hoses; Egress; Safety violations; Types of explosions; Hazards of explosions.  - <b>EXAM 2</b>
11 (10/30- 11/5) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Extra reading materials prepared by the instructor	- Robotics Safety
12 (11/6- 11/12) Monday, and Wednesday 4:05-4:50	Boyi Hu	Extra reading materials prepared by the instructor	

(Friday is a holiday)			
13 (11/13-11/19) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Extra reading materials prepared by the instructor	
14 (11/20-11/26) Monday 4:05-4:50 (Wednesday and Friday are holidays)	Boyi Hu	Chapter 24  Extra reading materials prepared by the instructor.	- Hazard communication standard; Chemical hazards; Worker-right-to-know; Labeling; DOT HazMAT; MSDS; Global harmonization system
15 (11/27-12/3) Monday, Wednesday and Friday 4:05-4:50	Boyi Hu	Chapter 12  Extra reading materials prepared by the instructor.	- Electrical Hazards – Regulations; Basics of electricity; Shock; Physiological effects; Static electricity; Hazard types; Prevention and insulation; PPE; Guarding; Grounding; Safe work practices; Voltage testing - Guest lecture
16 (12/4-12/10) Monday, Wednesday 4:05-4:50	Boyi Hu		Wrap up and <b>Final Exam</b>

### **Required Textbooks and Software**

- Safety and Health for Engineers (3<sup>rd</sup> edition)
- Roger L. Brauer
- Wiley, 3<sup>rd</sup> edition, 2016
- 978-1118959459

### **Recommended Materials**

- Occupational Safety and Health for Technologists, Engineers, and Managers (9<sup>th</sup> edition)
- David L. Goetsch
- Pearson, 9<sup>th</sup> edition, 2018
- 978-0134695815

**Semester robotics safety project (only for EIN 6216 students):** This project aims to develop your skill of reading academic research articles in different occupational areas and develop your skill of summarizing the key content from them. In addition, literature on different quantitative accident analysis methods will also be reviewed. This will culminate in a research paper of 5-8 pages in which you will summarize the findings of one safety topic we will cover throughout the semester. The first step will be to determine your safety topic and compile the list of references you will be using for your literature review and submit them for review. This reference list should include at least 5 journal articles, although you can substitute 2 conference papers for 1

journal article if articles are scarce in your topic of choice. After they are approved you will be able to start your review. Your references should cover at least two types of accident analysis methods that are covered in the class although you may add more if you would like. The paper should have 1.5 spacing, 12-point Arial font, and 1" margins. You may be deducted points if you do not follow these guidelines. This stipulation mimics the regulations that are followed by actual journal articles and the qualifying exam of our department. The final paper should not exceed the upper limit. You will also give an in-person presentation at the end of the semester summarizing the content of your paper.

### ***Attendance Policy, Class Expectations, and Make-Up Policy***

This class is going to be held in person, unless the course instructor is out of town for scientific conferences and federal funded research projects. This is in line with a recent university policy that encourages in-person classes as we adjust to the new normal of COVID-19 becoming endemic in our community. The lectures are there for your benefit as apart from the lecture itself, you can ask questions about topics you are not certain of in class and get a quicker response than email or office hours. You will be responsible for everything covered in class. Excused absences are consistent with university policies in the undergraduate catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>) and require appropriate documentation.

### ***Evaluation of Grades (EIN4216)***

<b>Assignment</b>	<b>Percentage of Final Grade</b>
HW assignments	30%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	20%
Attendance and Quizzes	10%
Total	100%

### ***Evaluation of Grades (EIN6216)***

<b>Assignment</b>	<b>Percentage of Final Grade</b>
HW assignments	20%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	20%
Attendance and Quizzes	10%
Semester Project	10%
Total	100%

### ***Grading Policy***

<b>Percent</b>	<b>Grade</b>	<b>Grade Points</b>
90.0 - 100.0	A	4.00
87.0 - 89.9	A-	3.67
84.0 - 86.9	B+	3.33
81.0 - 83.9	B	3.00
78.0 - 80.9	B-	2.67
75.0 - 77.9	C+	2.33

72.0 – 74.9	C	2.00
69.0 - 71.9	C-	1.67
66.0 - 68.9	D+	1.33
63.0 - 65.9	D	1.00
60.0 - 62.9	D-	0.67
0 - 59.9	E	0.00

**A grade of C is required to pass this class. A C- is NOT considered passing.**

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

### ***Students Requiring Accommodations***

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:

<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

### ***Online Course Recording***

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments

live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

### ***Campus Resources:***

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email [covid@shcc.ufl.edu](mailto:covid@shcc.ufl.edu)) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the UF Health Screen, Test & Protect website for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

### ***Health and Wellness***

#### **U Matter, We Care:**

If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352 392-1575 so that a team member can reach out to the student.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

#### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

### ***Academic Resources***

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling.  
<https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.

**Commitment to a safe and inclusive learning environment**

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination.

It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@ufl.edu

**Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the Office of Title IX Compliance, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu