Course Syllabus

Course Description

Examines advanced practical theory as it applies to the classical industrial hygiene field. Reviews an array of investigative, scientific, engineering, organizational, and social skills that are necessary to effectively control occupational and environmental health hazards.

Course Textbook(s)


Course Learning Outcomes

Upon completion of this course, students should be able to:

1. Summarize the historical underpinnings of the field of industrial hygiene.
2. Examine the role of the Occupational Safety and Health Administration (OSHA), National Institute for Occupational Safety and Health (NIOSH), and other relevant organizations that influence workplace safety and health.
3. Assess toxicological principles related to industrial hygiene issues.
4. Compare various occupational exposure limits (OELs) and their uses.
5. Explain key industrial hygiene concepts such as routes of entry and hierarchy of controls.
6. Examine different types of industrial hazards commonly addressed by the industrial hygienist.
7. Evaluate common industrial hygiene related hazard assessment and control strategies.
8. Apply industrial hygiene management principles and practices to workplace situations.

Credits

Upon completion of this course, the students will earn 3 hours of college credit.

Course Structure

1. Study Guide: Course units contain a Study Guide that provide students with the learning outcomes, unit lesson, required reading assignments, and supplemental resources.
2. Learning Outcomes: Each unit contains Learning Outcomes that specify the measurable skills and knowledge students should gain upon completion of the unit.
3. Unit Lesson: Unit Lessons, which are located in the Study Guide, discuss lesson material.
4. Reading Assignments: Units contain Reading Assignments from one or more chapters from the textbook and/or outside resources.
5. Suggested Reading: Suggested Readings are listed within the Study Guide. Students are encouraged to read the resources listed if the opportunity arises, but they will not be tested on their knowledge of the Suggested Readings.
6. Learning Activities (Non-Graded): Non-Graded Learning Activities are provided to aid students in their course of study.
7. Discussion Boards: Discussion Boards are part of all CSU Term courses. More information and specifications can be found in the Student Resources link listed in the Course Menu bar.
8. Unit Assessments: This course contains Unit Assessments, which test student knowledge on important aspects of the course. These tests may come in many different forms, ranging from multiple choice to written response questions.
9. Unit Assignments: Students are required to submit for grading Unit Assignments. Specific information and instructions regarding these assignments are provided below. Grading rubrics are included with each assignment. Specific information about accessing these rubrics is provided below.
10. Ask the Professor: This communication forum provides you with an opportunity to ask your professor general or specific questions related to the course content.
CSU Online Library

The CSU Online Library is available to support your courses and programs. The online library includes databases, journals, e-books, and research guides. These resources are always accessible and can be reached through the library webpage. To access the library, log into the myCSU Student Portal, and click on "CSU Online Library." You can also access the CSU Online Library from the "My Library" button on the course menu for each course in Blackboard.

The CSU Online Library offers several reference services. E-mail (library@columbiasouthern.edu) and telephone (1.877.268.8046) assistance is available Monday – Thursday from 8 am to 5 pm and Friday from 8 am to 3 pm. The library’s chat reference service, Ask a Librarian, is available 24/7; look for the chat box on the online library page.

Librarians can help you develop your research plan or assist you in finding relevant, appropriate, and timely information. Reference requests can include customized keyword search strategies, links to articles, database help, and other services.

Unit Assignments

Unit I PowerPoint Presentation

Create a 10- to 15-slide PowerPoint presentation (not counting the title and reference slides) that provides an overview of industrial hygiene. You may use the textbook, the Occupational Safety and Health Administration (OSHA) booklet on industrial hygiene (provided in the Suggested Readings for Unit I), the American Industrial Hygiene Association (AIHA) website, and other sources as you see fit. Be sure to create a reference slide that cites all sources using APA format.

Include the following information in your presentation:

- Define industrial hygiene, and include information regarding the work of early pioneers in the field of industrial hygiene.
- Describe how the Occupational Safety and Health Act of 1970 advanced the field of industrial hygiene.
- Discuss the major U.S. industrial hygiene organizations, such as OSHA, AIHA, the National Institute for Occupational Safety and Health (NIOSH), and the American Conference of Governmental Industrial Hygienists (ACGIH), and define their roles in industrial hygiene and the protection of workers from hazards in the workplace. (You may include foreign organizations if you are currently working outside of the United States.)
- Briefly describe the code of ethics for industrial hygienists.
- Explain the impact of federal regulations on workplace safety and health.
- Define the types of hazards addressed by industrial hygienists.
- Discuss the types of control methods used by industrial hygienists.
- Describe the role industrial hygiene plays in an injury and illness prevention program.

Use the notes section within PowerPoint to create the dialogue or script that you would use when speaking to the audience about the information presented on each slide. Your PowerPoint presentation should be constructed using Times New Roman font, and the slides should not contain a font smaller than 30 points; 28 points should be the absolute minimum.

Information about accessing the grading rubric for this assignment is provided below.

Unit II Essay

Imagine that you are an industrial hygienist or a safety officer, and you have been asked to create a safety data sheet (SDS) for the employees within the manufacturing facility where you work. However, in this assignment, you will not actually create the SDS. You will just be collecting and studying specific data about the toxicity of certain chemicals that could be used to create it. Assume that the following chemicals/compounds are released during the manufacturing process:

- benzene,
- vinyl chloride,
- asbestos,
- ammonia, and
- hydrogen chloride.

Choose one of these chemicals, and review the toxicology data for it.

Create at least a two-page essay which outlines the following information about the chemical:

- How can the route of exposure affect the toxicity of the chosen chemical/compound?
- How are the mechanisms of action and modes of action established surrounding how to deal with exposure to the chemical/compound?
- What are the effects that the chemical/compound chosen can have on the human body from the initial exposure to elimination?

Your essay should also discuss how the Bradford Hill criteria for causation is used to determine the strength of the toxicology data you reviewed. The essay should be at least two pages in length (not counting the title and reference pages) and should utilize proper APA citations and references.

The websites below are good places to begin looking for information regarding your specific chemical/compound:
Information about accessing the grading rubric for this assignment is provided below.

Unit IV Essay

After reading the Unit IV Lesson and your assigned readings, choose three substances that were discussed. One substance must be a gas/vapor hazard, one must be an aerosol hazard, and one must be a biological hazard.

Write a minimum of one page for each hazard you choose (a minimum of three pages total), which summarizes the following information:

- Explain whether the substance is a chemical or biological hazard, and explain how you determined that.
- Explain the key chemical properties (vapor pressure, vapor density, molecular weight, relative size) as applicable, and describe how these properties affect the different routes of exposure. Based on the chemical properties, how would you identify which exposure route is the most important?
- Analyze how the substance could enter the body through the dermal route, and discuss why the dermal route would or would not be important.
- Describe the region of the respiratory system where deposition would be expected (only for the aerosol hazard).

You should use your textbook and resources from the CSU Online Library to obtain information for this assignment. You must use proper APA formatting for all references that you use. The title page and reference page do not count toward meeting the required page count.

Information about accessing the grading rubric for this assignment is provided below.

Unit V Article Review

In the Health and Medical Collection database within the CSU Online Library, locate and read the following article:


Write a summary of the article that addresses the following variables:

- Summarize the industrial hygiene sampling procedures that were used in the study to evaluate a chemical hazard.
- Explain the results of each of the sampling procedures used, how those results were used to evaluate occupational exposures, and the potential health effects of chemical hazards.
- Provide your opinion as to which of the sampling procedures used in the study provided the most accurate and precise information about the occupational exposures of the workers and potential health effects. Explain why you chose one particular sampling procedure over the others.

You should use the textbook and resources from the CSU Online Library to obtain information for this assignment. Your article review must be a minimum of three pages in length, not counting the title page and reference page. Use APA style when writing the paper, making certain to include in-text citations and references.

Information about accessing the grading rubric for this assignment is provided below.

Unit VI Scholarly Activity

In the following assignment, you will be given two different questions concerning the material covered in this unit. Each question should be answered using a minimum of 250 words. Any resources, including your textbook, that are utilized to answer the questions should be cited and referenced using APA formatting. A template has been provided here for you to use to answer the questions. Enter your answers into the template, and upload the template into the assignment area within Blackboard. The questions you will be answering are shown below (and in the template).

The Occupational Safety and Health Administration (OSHA) currently has a permissible exposure limit (PEL) for noise of 90 dBA at an 8-hour time-weighted average (TWA) exposure with an action level of 50% of that exposure. OSHA uses a 5 dB exchange rate (doubling rate); this means that if the exposure increases from 90 dBA to 95 dBA, the allowed exposure time decreases to one-half—from 8 hours to 4 hours.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend using an exposure limit of 85 dBA instead of 90 dBA and also recommend using a 3 dB exchange rate. These levels are much more protective than the levels currently used by OSHA.

Discuss the merits of each of the two methods. Provide your opinion as to which of the approaches you believe should be used. Support your answer with at least one professional/scholarly reference.

OSHA does not currently have a regulation specifically covering ergonomic issues. OSHA has issued several guidelines for some specific industries. Consider a workplace you are familiar with where there is a potential for repetitive motion injuries.

Discuss what methods you would use to identify tasks that would present the greatest risk for repetitive motion injuries. How would you establish an ergonomics program to address the issues? What would be the greatest obstacles in establishing the ergonomics program?
Unit VIII Research Paper

For the following research paper assignment, you have been asked to perform an evaluation of employee exposures at a small automobile parts manufacturing facility. The manufacturing processes include two metal presses, two machining stations, three welding stations, a small paint booth, and a shipping/receiving area. There are two employees working at each press, one person working at each machining station, one person working at each welding station, two people working in the paint booth, and four employees working in the shipping/receiving area.

One of the presses is a 2,000-ton press, and the other press is a 200-ton press. The 2,000-ton press is the greatest noise source for the facility. The machining area uses a metal working fluid. The safety data sheet (SDS) for the metal working fluid is attached here. All welding is performed on stainless steel. The painting booth uses a powder coating operation, but the employees use xylene and methyl ethyl ketone (MEK) to clean the parts prior to the powder coating operation. At the end of the shift, one of the employees uses 1,3 butadiene to clean the nozzles for the paint booth. The facility uses two electric forklifts to move materials between the production area and the storage warehouse and between the warehouse and the shipping area. All employees work an 8-hour shift.

Part 1:

Using the information on anticipation and control we studied in the textbook, identify the hazards that are present in the facility. In your discussion, explain why you chose the hazards, and describe whether you believe the hazards to be actual hazards or potential hazards (which require further evaluation). Describe the specific location(s) at the facility where the hazards are located, and determine how many employees are potentially at risk in those areas.

Your response for Part 1 should be at least one page in length.

Part 2:

Using the information on evaluation that we studied in the textbook, summarize how you would measure the personal exposures to the hazards that you identified in Part 1. Use the Occupational Safety and Health Administration (OSHA) website (https://www.osha.gov/dts/sltc/methods/toc.html) or the National Institute for Occupational Safety and Health (NIOSH) website (http://www.cdc.gov/niosh/docs/2003-154/default.html) to select the specific sampling and analytical method that would work best to evaluate any chemical hazards you identified. Provide a summary of the sampling media you would use, include the sampling flow rate, discuss how long you would sample, and explain how you would calibrate the sampling train. Include a discussion about why you selected the specific sampling and analytical method.

Your response to Part 2 should be at least one page in length.

Part 3:

Access the attached sampling results here. For each set of results, perform the following actions:

- Calculate the 8-hour time weighted average (TWA) exposure.
- Compare the results to the appropriate OSHA permissible exposure limit (PEL).
- Determine which results exceed an established OSHA PEL.

Write a one-page summary of the sampling results; document the exposures that exceeded an OSHA PEL, and identify those areas that you believe will require the application of controls to reduce risk. Include your calculations, include a list of the OSHA PELs you compared the results to, and explain how you decided that an exposure exceeded an OSHA PEL.

Your response to Part 3 should be at least one page in length.

Part 4:

Using OSHA’s hierarchy of controls, recommend the control methods that you believe would be the most effective for reducing the risks associated with the exposures that exceeded the OSHA PEL above. Explain how you would implement the controls and how you would evaluate the effectiveness of the controls. Also, discuss any interim control methods you would recommend for the facility.

This section should be at least one page in length.

Include a reference page and in-text citations for all sources you used in this project, including your textbook, using proper APA format.

Information about accessing the grading rubric for this assignment is provided below.

APA Guidelines

The application of the APA writing style shall be practical, functional, and appropriate to each academic level, with the primary purpose being the documentation (citation) of sources. CSU requires that students use APA style for certain papers and projects. Students should always carefully read and follow assignment directions and review the associated grading rubric when available. Students can find CSU’s Citation Guide by clicking here. This document includes examples and sample papers and provides information on how to contact the CSU Success Center.

Grading Rubrics
This course utilizes analytic grading rubrics as tools for your professor in assigning grades for all learning activities. Each rubric serves as a guide that communicates the expectations of the learning activity and describes the criteria for each level of achievement. In addition, a rubric is a reference tool that lists evaluation criteria and can help you organize your efforts to meet the requirements of that learning activity. It is imperative for you to familiarize yourself with these rubrics because these are the primary tools your professor uses for assessing learning activities.

Rubric categories include: (1) Discussion Board, (2) Assessment (Written Response), and (3) Assignment. However, it is possible that not all of the listed rubric types will be used in a single course (e.g., some courses may not have Assessments).

The Discussion Board rubric can be found within Unit I’s Discussion Board submission instructions.

The Assessment (Written Response) rubric can be found embedded in a link within the directions for each Unit Assessment. However, these rubrics will only be used when written-response questions appear within the Assessment.

Each Assignment type (e.g., article critique, case study, research paper) will have its own rubric. The Assignment rubrics are built into Blackboard, allowing students to review them prior to beginning the Assignment and again once the Assignment has been scored. This rubric can be accessed via the Assignment link located within the unit where it is to be submitted. Students may also access the rubric through the course menu by selecting “Tools” and then “My Grades.”

Again, it is vitally important for you to become familiar with these rubrics because their application to your Discussion Boards, Assessments, and Assignments is the method by which your instructor assigns all grades.

Communication Forums

These are non-graded discussion forums that allow you to communicate with your professor and other students. Participation in these discussion forums is encouraged, but not required. You can access these forums with the buttons in the Course Menu.

Ask the Professor

This communication forum provides you with an opportunity to ask your professor general or course content questions. Questions may focus on Blackboard locations of online course components, textbook or course content elaboration, additional guidance on assessment requirements, or general advice from other students.

Questions that are specific in nature, such as inquiries regarding assessment/assignment grades or personal accommodation requests, are NOT to be posted on this forum. If you have questions, comments, or concerns of a non-public nature, please feel free to e-mail your professor. Responses to your post will be addressed or e-mailed by the professor within 48 hours.

Before posting, please ensure that you have read all relevant course documentation, including the syllabus, assessment/assignment instructions, faculty feedback, and other important information.

Student Break Room

This communication forum allows for casual conversation with your classmates. Communication on this forum should always maintain a standard of appropriateness and respect for your fellow classmates. This forum should NOT be used to share assessment answers.

Schedule/Grading

The following pages contain a printable Course Schedule to assist you through this course. By following this schedule, you will be assured that you will complete the course within the time allotted.

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<th>Unit I</th>
<th>Introduction to Industrial Hygiene</th>
<th>[ Weight: 12% ]</th>
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<tr>
<td>Read/View:</td>
<td>• Unit I Study Guide</td>
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<td>• Chapter 1: Introduction to Industrial Hygiene</td>
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<td>• Chapter 2: The Occupational Safety and Health Act and Industrial Hygiene</td>
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<td>Unit II</td>
<td>The Use of Toxicological Data for Industrial Hygiene Practice</td>
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### Unit VII
**Evaluation of Physical Hazards Commonly Present in Industrial Settings**  
**[Weight: 12%]**

**Read/View:**
- Unit VII Study Guide
- Chapter 11: Noise, pp. 248-256
- Chapter 12: Radiation, pp. 267-288
- Chapter 13: Thermal Stressors, pp. 301-309
- Chapter 14: Ergonomics, pp. 331-337

**Discuss:**
- Unit VII Discussion Board

**Submit:**
- Unit VII Assessment
  - 10%

### Unit VIII
**Control Strategies Commonly Used by Industrial Hygienists**  
**[Weight: 16%]**

**Read/View:**
- Unit VIII Study Guide
- Chapter 8: Ventilation, pp. 159-185
- Chapter 9: Respiratory Protection, pp. 191-211
- Chapter 13: Thermal Stressors, pp. 309-316
- Chapter 14: Ergonomics, pp. 337-345

**Discuss:**
- Unit VIII Discussion Board

**Submit:**
- Unit VIII Research Paper
  - 14%