Course Description

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

Course Textbook


Course Learning Outcomes

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

1. Describe the history and philosophy of industrial hygiene and the code of ethics in the practice of occupational hygiene.
2. Generalize the role of the industrial hygienist as an investigator in both the traditional industrial setting and in the less traditional public and environmental health fields.
3. Explain the role of OSHA, NIOSH, and the other agencies and organizations that influence workplace procedures.
4. Describe the important aspects of toxicology from an industrial hygiene standpoint.
5. Explain the different routes of exposure (inhalation, ingestion, absorption, injection) and their effects on potential exposure.
6. Discuss the different occupational exposure limits, how they are established, and how they are used to prevent workplace injury and illness.
7. Distinguish between the different types of hazards (chemical, physical, and biological), their effects, and dose-response relationships.
8. Describe the elements of an exposure assessment program and explain the process for determining if an exposure is acceptable or unacceptable.
9. Assess the basic exposure situations, including calculating time weighted averages and comparing them with the OSHA defined permissible exposure limits (PEL’s), ACGIH threshold limit values (TLV’s), and NIOSH recommended exposure levels (REL’s).
10. Discuss the various industrial hygiene control methods used to prevent worker exposure to workplace hazards.

Credits

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

Course Structure

1. **Unit Learning Outcomes:** Each unit contains Learning Outcomes that specify the measurable skills and knowledge students should gain upon completion of the unit.
2. **Unit Lesson:** Each unit contains a Unit Lesson, which discusses lesson material.
3. **Reading Assignments:** Each unit contains Reading Assignments from one or more chapters from the textbook or website. Suggested Readings are provided in the unit study guides to aid students in their course of study.
4. **Unit Assessments:** This course contains six Unit Assessments, one to be completed at the end of Units I-III, and V-VII. Assessments are composed of multiple-choice questions and written response questions.
5. **Unit Assignments:** Students are required to submit for grading Unit Assignments in Units I, IV, and VIII. Specific information and instructions regarding these assignments are provided below.
6. **Ask the Professor:** This communication forum provides you with an opportunity to ask your professor general or course content related questions.

7. **Student Break Room:** This communication forum allows for casual conversation with your classmates.

**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 title and reference slides) that provides an overview of industrial hygiene. You may use the textbook, the OSHA pamphlet on Industrial Hygiene, the 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:

- Definition/explanation of industrial hygiene
- Major U.S. industrial hygiene organizations
- Code of ethics
- Impact of federal regulations
- Types of hazards addressed by industrial hygienists
- Types of control methods used by industrial hygienists
- Role industrial hygiene plays in an injury and illness prevention program

Use the notes section within PowerPoint to create the dialog or script that you would use when speaking to the audience about the information presented on your slide. Your PowerPoint presentation should be constructed using a serif type font. A serif type font is, in principle (for high-resolution media), easier to read than a non-serif type font because the individual characters differ more from each other. The standard is Times New Roman. Do not use a sans serif font such as Arial. Also, it is recommended that PowerPoint presentation slides should not contain a font smaller than thirty points; twenty eight points should be the absolute minimum.

**Unit IV Article Critique**

One significant industrial hygiene related situation that occurred in the not too distant past involved workers at a microwave popcorn facility who were diagnosed with a debilitating lung disease known as bronchiolitis obliterans. The industrial hygiene and public health community was somewhat taken off guard when a number of workers suffered severe, irreparable lung dysfunction at a Missouri popcorn plant. After all, these folks didn’t work with what had traditionally been identified as highly hazardous substances. They worked with food products and butter flavorings.

In the early 2000s this was considered an emerging issue. A lot has been learned about butter flavorings over the years. However, the substance identified as Diacetyl and similar products used as food flavorings continue to be a significant issue and are identified as primary culprits behind several clusters of bronchiolitis obliterans tied to workers at food processing facilities that use butter flavoring.

In order for the link to function properly, you must first log into the myCSU Student Portal and access the ABI/Inform Complete database within the CSU Online Library. Next, search for “Schroth, Diacetyl exposures & controls.” Select the first result that is produced.

Assignment:

Using APA format, please provide a minimum of a 2 page article review in which you will:

- Identify the primary issue and why it is still a problem in industry more than a decade after the hazard was identified?
- Discuss progress with establishing exposure limits.
- Discuss steps that food industry companies like microwave popcorn manufacturers can take to limit employee exposure, making sure to consider the hierarchy of controls in your assessment.
- What is the role of the industrial hygienist in helping to control exposure?

**Unit VIII Research Paper**

Each student will research an industrial hygiene sampling event and develop a comprehensive exposure assessment report. Students can select from:

- Asbestos exposure from the World Trade Center disaster
- The Deepwater Horizon Oil Spill

Assume that you work for Acme Industrial Hygiene Consultants and you are at an event conducting air samples. In your paper, you will discuss:

- What was going on during sampling?
- What was your sampling method?
- What are your results?

You are expected to use the AIHA Statistical Spreadsheet to assist you in analyzing the data. To access the spreadsheet please follow the following directions:

2. Click on the tab title “Get Involved” to search for “Exposure Assessment Strategies Committee.”
3. Next, select “Volunteer Groups.”
4. Click on “Exposure Assessment Strategies Committee.”
5. Scroll down and select “New IHSTAT Macro Free Version.”
6. Once you have loaded the excel document, make sure to click “Enable Editing” at the top of the spreadsheet.
7. Under the OEL section, insert the OEL for asbestos or benzene that you will use here.
8. Delete the existing date in the sheet, and enter the trailer sample dataset you choose.
9. As you populate the spreadsheet, the statistics will calculate, and the graphs will begin forming the picture of the exposure profile of the trailers.

To locate a tutorial on how to use the AIHA spreadsheet, please view the following video, *Instructions for Using the AIHA Statistical Spreadsheet*, located at [https://youtu.be/v4JeQW0JF6k](https://youtu.be/v4JeQW0JF6k). (For a transcript for this video please click [here](https://youtu.be/v4JeQW0JF6k).)

You will also need to discuss:

- The descriptive statistics for the dataset
- The number of samples above the OEL (if any)
- What the 95th percentile exposure level would be?
- What exposure category you would put the workers’ exposure into (e.g., 0, 1, 2, 3, or 4)?

You will find that each data set has a number of samples broken down into different activities. Assume that each activity would be a different SEG. Select 1 or 2 SEGs for the purpose of your analysis and report.

If you choose to use the World Trade Center data, you can choose from either the Lower Manhattan Asbestos Data, or the Staten Island Asbestos Data. You can find the data at the following OSHA website: [http://www.osha.gov/nyc-disaster/wtc.html](http://www.osha.gov/nyc-disaster/wtc.html)

If you choose to use the Deepwater Horizon dataset, focus on the potential benzene exposure. You will also need to select one SEG / task for the purpose of your research (e.g., boat operators, beach cleanup). The dataset is very large and you will want to keep your research focused to a manageable level. It would be acceptable to select a few of the...
SEGs for comparison. For example, you could compare the boat operator’s exposure to that of the beach cleanup crew. You can find the data on the OSHA website at the following address: http://www.osha.gov/oilspills/index_sampling.html

You will find that the AIHA spreadsheet does not allow you to enter a “non-detect” value of zero (0). There are various substitution techniques for estimating distribution parameters from datasets containing censored data: each censored datum is replaced with the (1) LOD, (2) half of the LOD, (3) or LOD divided by the square root of 2. Simple substitution (just using the actual LOD) works well when the percentage of LOD values is small. See Unit VIII Study Guide for more information.

An example report is provided to give you an idea of how to properly develop a comprehensive written report. Your report does not have to follow this exactly; it is provided as an example only. However, your report should address all 7 items listed above for full credit.

Click here to access the sample report.

Your report should be a minimum of five pages in length. All sources used, including the textbook, must be referenced; paraphrased and quoted material must have accompanying citations.

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) Assessment (Written Response) and (2) 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 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 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. Instructions for subscribing/unsubscribing to these forums are provided below.

Once you have completed Unit VIII, you MUST unsubscribe from the forum; otherwise, you will continue to receive e-mail updates from the forum. You will not be able to unsubscribe after your course end date.

Click here for instructions on how to subscribe/unsubscribe and post to the Communication Forums.
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 email your professor. Responses to your post will be addressed or emailed 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.

Grading

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<td>Unit IV Article Critique</td>
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<td>Unit VIII Research Paper</td>
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<td><strong>Total</strong></td>
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Course Schedule/Checklist (PLEASE PRINT)

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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### Unit I  
**Introduction to Industrial Hygiene**

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 1: Overview of Industrial Hygiene
  - Suggested Reading: See Study Guide

**Submit:**  
- Assessment
  - PowerPoint Presentation

**Notes/Goals:**

### Unit II  
**Impact of Regulations on Occupational Health**

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 30: Government Regulations
- Chapter 31: International Developments in Occupational Safety and Health
  - Suggested Reading: See Study Guide

**Submit:**  
- Assessment

**Notes/Goals:**

### Unit III  
**Industrial Toxicology**

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 6: Industrial Toxicology
  - Suggested Reading: See Study Guide

**Submit:**  
- Assessment

**Notes/Goals:**

### Unit IV  
**Recognition of Hazards (Part 1: Chemical Agents)**

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 7: Gases, Vapors, and Solvents
- Chapter 8: Particulate Matter

**Submit:**  
- Article Critique

**Notes/Goals:**
### Unit V  Recognition of Hazards (Part 2: Physical Agents)

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 9: Industrial Noise
- Chapter 10: Ionizing Radiation
- Chapter 12: Thermal Stress
- Suggested Reading: See Study Guide

**Submit:**  
- Assessment

**Notes/Goals:**

### Unit VI  Evaluation of Hazards

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 15: Evaluation
- Chapter 16: Air Sampling
- Chapter 17: Direct-Reading Instruments for Gases, Vapors, and Particulates

**Submit:**  
- Assessment

**Notes/Goals:**

### Unit VII  Control of Hazards

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 18: Methods of Control
- Chapter 19: Local Exhaust Ventilation
- Chapter 20: Dilution Ventilation of Industrial Workplaces
- Chapter 22: Respiratory Protection
- Chapter 23: Personal Protective Equipment

**Submit:**  
- Assessment

**Notes/Goals:**

### Unit VIII  Recordkeeping & Reporting

**Review:**  
- Unit Study Guide

**Read:**  
- Chapter 29: The Industrial Hygiene Program
- Appendix D: Review of Mathematics

**Submit:**  
- Research Paper

**Notes/Goals:**