Course Description

In-depth study of advanced pollution prevention practices and the preparation of a pollution prevention management plan. Emphasizes methodologies that achieve environmental compliance through less expensive pollution control methods.

Prerequisites

None

Course Textbook


Course Learning Objectives

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

1. Provide a comprehensive overview of the principles of waste minimization, clean production, recycling, waste utilization and pollution prevention.
2. Explain the concepts of efficient use of energy and energy conservation.
4. Discuss the Environmental Management System (EMS) and ISO 14000.
5. Explain an overview of the properties and environmental fates of priority pollutants as well as pollution control equipment and techniques.
6. Describe the principles and practices of cost accounting applied to industry.
7. Identify the step-by-step approach for carrying out the pollution prevention audit.
8. Explain an approach to conducting a P2 audit aimed at identifying waste and pollution reduction.
9. Understand the manufacturing processes of various chemical industries and low-cost pollution prevention practices in some selected case studies.
10. Describe the manufacturing processes of various petroleum refining industries and metallurgical industries, pollution prevention practices and opportunities in both petroleum refining and metallurgical industries.
11. Describe the manufacturing processes of paper and pulp, food manufacturing, tanning and leather finishing, beverage, cement, wood preserving, electronic manufacturing, electroplating, foundries, glass manufacturing, textiles and printing industries, pollution prevention practices and opportunities in some selected industries.
12. Provide a final guidance on developing and implementing P2 practices within your own company.

Credits

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

Course Structure

1. **Unit Summaries:** Units I-VII contain an overview, or summary, of the information to be covered.
2. **Unit Learning Objectives:** Units I-VII contain learning objectives that specify the measurable skills and knowledge students should gain upon completion of the unit.
3. **Key Terms**: Key terms are intended to guide students in their course of study. Students should pay particular attention to key terms as they represent important concepts within the unit material and reading.

4. **Reading Assignments**: Units typically contain reading assignments from one or more chapters of the textbook and are supplemented with additional readings or Internet sources to provide broader subject matter application and professional relevance. Please note Units IV and VIII do not contain reading assignments.

5. **Discussion Boards**: Discussion Boards are a part of all CSU term courses. Information and specifications regarding these assignments are provided in the Academic Policies listed in the Course Menu bar.

6. **Unit Assessments** are to be taken by students at the completion of Units I-III and V-VII, and may contain both objective and subjective type questions.

7. **Research Paper (due in Unit IV)**: Information and specifications regarding this assignment are provided in the syllabus below, and in the Unit IV Study Guide. When you are ready to submit your completed assignment, select the "View/Complete" link located in Unit IV.

8. **Final Examination (Proctored)**: All final examinations are supervised by an approved Proctor. You are permitted four (4) hours to complete this exam, in the presence of your approved proctor. This is an open book exam. Only course textbooks and a calculator, if necessary, are allowed when taking proctored exams.

9. **Ask the Professor**: This communication forum provides you with an opportunity to ask your professor general or course content related questions.

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

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**Research Paper**

For your Research Paper assignment, please select one of the following topics:

1. Pollution prevention has various meanings and is frequently used. Toxics use/reduction and source reduction are the narrowest terms, being restricted to raw material or production process changes. Pollution prevention promotes a hierarchy that favors source reduction, but also promotes other minimization techniques or treatment where production changes are infeasible. Explain why the best approach is one that cost-effectively reduces waste, minimizes worker exposure to toxic materials, optimizes use of materials, improves a product's competitiveness in local and world markets, and enhances a company's image of responsibility to the community.

2. Many commercial and industrial companies have established pollution prevention programs with the goals of reducing cost and liabilities and improving compliance with state and federal regulations. The processes for evaluating projects under these programs vary significantly from company to company and from industry to industry. Describe the economic tools needed by companies to make decisions about funding pollution prevention projects. Choose a case study.

3. Methods of pollution prevention in different manufacturing industries are tailored to specific sources and types of pollutants. These methods vary from industry to industry that use technology to remove pollutants and effluents before they enter the atmosphere, soil and water. In a highly technological society, is it possible to have 100% clean air, water or soil? Is it feasible or likely?

4. The role of environmental management is one of the most rapidly changing areas of management. Its focus has shifted from reacting to crises and solving problems to complying with regulations. The next stage of environmental management goes beyond compliance to pollution prevention. Search out the (1) public apathy to public concern, (2) local, national and international interests, (3) regulatory compliance to continual improvement, and (4) environmental costs to competitive advantages.

Submit your selected topic and a summary outline to your professor via email for approval. Be sure to receive approval before submitting your Research Paper. Generally, your outline should include the following major sections which correspond to level 1 headings per APA publications guidelines:

I. **Introduction** – Briefly describe the issue and state the purpose for the paper.

II. **Background** – Review relevant literature on the subject. This is a good section to satisfy the requirement for 5 + primary sources. Be sure to use APA formatted in-text citations to identify sources for information. Note that in-text citations are required even if the information has been reworded. You are required to give credit to authors for their published work regardless of whether the work is presented in quotes, paraphrased, or the concept alone is presented. The source for concepts must be identified with APA formatted in-text citations.

III. **Methods** – State how you will address the issue. For example, you could perform a literature review of related research literature, conduct interviews, and/or perform observations. If you use a tool such as a standardized checklist you should provide information from the research literature on the tool's reliability and validity.

IV. **Results** – Present the findings from implementation of your selected methods. The inclusion of tables, figures, and/or pictures in addition to describing the results in the text adds much to the paper's readability.
V. **Conclusions** – Present your conclusions and recommendations. In general your own opinions should only be included in this section.

VI. **References** – Must be in APA format.

After your topic and summary outline have been approved, prepare a well-organized and thoughtful 5-7 page Research Paper. The title page and reference page are not included in the required paper length. Be sure to include section headings per APA publication guidelines. Your paper must contain at least five references, and may include Internet sources, books, and professional journals or resources related to the profession.

CSU requires that students use the APA format in writing course papers. Therefore, the APA rules for formatting, quoting, paraphrasing, citing, and listing of sources are to be followed.

To submit your completed Research Paper upload it using the "View/Complete" link located in Unit IV. **Do not e-mail your paper directly to your professor.** By uploading through Blackboard, your university record will automatically be updated to indicate you have submitted your paper and it will be provided to your professor for grading.

**APA Guidelines**

CSU requires that students use the APA style for papers and projects. Therefore, the APA rules for formatting, quoting, paraphrasing, citing, and listing of sources are to be followed. A document titled “APA Guidelines Summary” is available for you to download from the APA Guide Link, found in the Learning Resources area of the myCSU Student Portal. It may also be accessed from the Student Resources link on the Course Menu. This document provides links to several internet sites that provide comprehensive information on APA formatting, including examples and sample papers.

**CSU Grading Rubric for Papers/Projects**

The course papers will be graded based on the CSU Grading Rubric for all types of papers. In addition, all papers will be submitted for electronic evaluation to rule out plagiarism. Course projects will contain project specific grading criteria defined in the project directions. To view the rubric, click the Academic Policies link on the Course Menu, or by accessing the CSU Grading Rubric link, found in the Learning Resources area of the myCSU Student Portal.

**Final Exam**

Final examinations are to be administered to students by an approved proctor on a date that is mutually convenient. The student is responsible for selecting a qualified proctor that must be approved by the University.

A list of acceptable proctors is provided in the Examination Proctor Policy. To review the complete Examination Proctor Policy including a list of acceptable proctors, proctor responsibilities, proctor approval procedures and the Proctor Agreement Form, go to the MyCSU Student Portal from the link below:

http://mycsu.columbiasouthern.edu

Proctored Final Exams are taken online. To request your proctored final exam, select the designated links found in the online course. You are permitted four (4) hours to complete this exam, in the presence of your approved proctor. This is an open book exam. Only course textbooks and a calculator, if necessary, are allowed when taking proctored exams.

**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.

[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

- Discussion Board (8 @ 2%) = 16%
- Unit Assessments (6 @ 8%) = 48%
- Research Paper (Unit IV) = 18%
- Final Exam = 18%
- Total = 100%

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.
By following this schedule, you will be assured that you will complete the course within the time allotted. Please keep this schedule for reference as you progress through your course.

### Unit I  Principles of Pollution Prevention and Waste Minimization

**Review:**
- Unit Study Guide

**Read:**
- Chapter 1: Principles of Pollution Prevention and Waste Minimization
- **Supplemental Reading:**
  - Pollution Prevention Concepts and Principles
  - [http://www.umich.edu/~nppcpub/resources/GENp2.pdf](http://www.umich.edu/~nppcpub/resources/GENp2.pdf)

**Discuss:**
- Discussion Board Response: Submit your response to the Discussion Board question by Saturday, Midnight (Central Time)

**Submit:**
- Assessment by Tuesday, Midnight (Central Time)

### Unit II  Managing Hazardous Chemicals

**Review:**
- Unit Study Guide

**Read:**
- Chapter 2: Managing Hazardous Chemicals
- **Supplemental Reading:**
  - Hazardous Waste Management Guide, Department of Environmental Health and Safety
  - [http://www.ehs.indiana.edu/em/hazwasne.shtml](http://www.ehs.indiana.edu/em/hazwasne.shtml)

**Discuss:**
- Discussion Board Response: Submit your response to the Discussion Board question by Saturday, Midnight (Central Time)
- Discussion Board Comment: Comment on another student’s Discussion Board response by Tuesday, Midnight (Central Time)

**Submit:**
- Assessment by Tuesday, Midnight (Central Time)
- Proctor Approval Form
- Research Paper Topic and Outline to Professor via email

Notes/Goals:
## Unit III: The Economics and Audit of Pollution Prevention

### Review:
- **Unit Study Guide**

### Read:
- **Chapter 3**: The Economics of Pollution Prevention
- **Chapter 4**: The Pollution Prevention Audit
- **Supplemental Reading**:

### Discuss:
- **Discussion Board Response**: Submit your response to the Discussion Board question by Saturday, Midnight (Central Time)
- **Discussion Board Comment**: Comment on another student’s Discussion Board response by Tuesday, Midnight (Central Time)

### Submit:
- **Assessment** by Tuesday, Midnight (Central Time)

### Notes/Goals:

## Unit IV: Research Paper

### Review:
- **Unit Study Guide**

### Read:
- **None**

### Discuss:
- **Discussion Board Response**: Submit your response to the Discussion Board question by Saturday, Midnight (Central Time)
- **Discussion Board Comment**: Comment on another student’s Discussion Board response by Tuesday, Midnight (Central Time)

### Submit:
- **Research Paper** by Tuesday, Midnight (Central Time)

### Notes/Goals:
### Unit V: Pollution Prevention Practices in the Chemical Process Industries

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<tr>
<th>Review:</th>
<th>Unit Study Guide</th>
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| Read:       | Chapter 5: Pollution Prevention Practices in the Chemical Process Industries  
**Supplemental Reading:**  
Chemical Industry Challenge Project, Joint Pollution Prevention Challenge and Recognition, California Department of Toxic Substances Control Information  
[http://www.dtsc.ca.gov/PollutionPrevention/ChallengeProject.cfm](http://www.dtsc.ca.gov/PollutionPrevention/ChallengeProject.cfm) |
| **Discuss:** | **Discussion Board Response:** Submit your response to the Discussion Board question by Saturday, Midnight (Central Time)  
**Discussion Board Comment:** Comment on another student’s Discussion Board response by Tuesday, Midnight (Central Time) |
| **Submit:**  | Assessment by Tuesday, Midnight (Central Time) |

### Notes/Goals:

### Unit VI: Pollution Prevention Practices in the Petroleum Refining and Metallurgical Industries

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<th>Unit Study Guide</th>
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| Read:       | Chapter 6: Pollution Prevention Practices in the Petroleum Refining Industry  
Chapter 7: Pollution Prevention Practices in the Metallurgical Industries  
**Supplemental Reading:**  
Metal Services Sector in the EPA  
[http://www.epa.gov/region02/p2/metals.htm](http://www.epa.gov/region02/p2/metals.htm) |
| **Discuss:** | **Discussion Board Response:** Submit your response to the Discussion Board question by Saturday, Midnight (Central Time)  
**Discussion Board Comment:** Comment on another student’s Discussion Board response by Tuesday, Midnight (Central Time) |
| **Submit:**  | Assessment by Tuesday, Midnight (Central Time) |

### Notes/Goals:
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<thead>
<tr>
<th>Unit VII</th>
<th>Miscellaneous Industry Practices and Case Studies, and Epilogue</th>
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<td>Read:</td>
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<td>□ Chapter 9: Epilogue</td>
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<td>□ Request to take Final Exam</td>
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<th>Unit VIII</th>
<th>Final Exam</th>
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