



Broward Community College

Course Outline

STATUS: A

COMMON COURSE NUMBER: EVS 1802

COURSE TITLE: Industrial Waste Streams

CREDIT HOURS: 4

CONTACT HOURS BREAKDOWN:

Lecture/Discussion	<u> 64 </u>
Lab	<u> 00 </u>
Other	<u> 8 </u>
Contact Hours/Week	<u> 4.5 </u>

CATALOG COURSE DESCRIPTION:

Prerequisite: CHM 1025, CHM 1025L or instructor permission

Corequisite: NONE

This course will familiarize the student with common categories of industrial process facilities. Using the techniques developed in this course, the student will become familiar with a variety of industrial processes. The student should gain an appreciation for how to reduce the hazardous material waste stream. Field trips required.

General Education Requirements - Associate of Arts Degree, meets Area(s):

General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES: (OVER, PLEASE)

UNIT TITLES:

1. Introduction to Principles of Flow of Materials and Waste Streams
2. Regulatory Agenda Overview
3. Electroplating, Metal Finishing, and Printed Circuit Board Production
4. Oil Refining and Chemical Production
5. Metal Production and Recycling
6. General Manufacturing
7. Printing and Reprographics
8. Plastics
9. Paper and Pulp
10. Auto and Marine Industries

Course Overview:

Upon successful completion of this course, the students should be able to demonstrate an understanding of the general principles of flow of materials in industrial processes, including exposure to general industrial operations that are common in the South, and to supply decision-makers with adequate and accurate technical data, recommendations, and conclusions.

II. Units:

Unit 1. Introduction to Principles of Flow of Materials and Waste Streams

General Outcome:

1.0 The students should be able to track the flow of materials during and after industrial processes.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Make a material balance of flow of materials for a continuous industrial process operation.
- 1.2 Assess points in the operation which could be altered in order to increase worker health and safety, ensure regulatory compliance, and reduce industrial liability and costs.

Unit 2. Regulatory Agenda Overview

General Outcome:

2.0 The students should be able to describe the appropriate regulations that affect industrial processes.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

2.1 Obtain information on and interpret the various environment laws and regulations that affect water (effluent) discharges, air emissions, and other hazardous waste streams from an industrial facility.

2.2 Obtain information and interpret the various "Right to Know" (RTK) hazardous materials regulations, OSHA Hazard Communication Standard, state RTK employee regulations, and the SARA Title III regulations.

2.3 Demonstrate how these regulations affect plant effluents, losses, waste streams emissions, external plant materials and product flows, and internal plant material flow and handling.

Unit 3. Electroplating, Metal Finishing and Printed Circuit Board Production

General Outcome:

3.0 The students should be able to describe the flow path for materials and waste relating to electroplating, metal finishing, and printed circuit board production.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

3.1 Explain the basic processes of the electroplating, metal finishing, and printed circuit board industries.

3.2 Identify specific hazardous materials and environmental regulation that pertain to this industry.

3.3 Recognize specific hazardous materials and hazardous waste problems in the industry, and by extension and analogy, other problems as they may arise.

3.4 Identify opportunities for hazardous waste minimization and source reduction in this industry.

Unit 4. Oil Refining and Chemical Production

General Outcome:

- 4.0 The students should be able to describe the flow path for materials and waste relating to oil refining and chemical production

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Identify unit operations of petroleum refining and chemical production.
- 4.2 Describe the specific regulations and constraints that pertain to the industry.
- 4.3 Identify opportunities for hazardous waste minimization and source reduction in this industry.

Unit 5. Metal Production and Recycling

General Outcome:

5.0 The students should be able to describe the flow path for materials and waste relating to metal production and recycling.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

5.1 Identify processing operations of ferrous and nonferrous metal production.

5.2 Describe the specific regulations and constraints that pertain to the industry.

5.3 Identify opportunities for hazardous waste minimization, source reduction, and recycling in this industry.

Unit 6. General Manufacturing

General Outcome:

6.0 The students should be able to describe the flow path for materials and waste relating to general manufacturing.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

6.1 Recognize unit operation and flow of materials within a general manufacturing industry.

6.2 Describe the specific regulations and constraints that pertain to the industry.

6.3 Identify opportunities for hazardous waste minimization and source reduction in this industry.

Unit 7. Printing and Reprographics

General Outcome:

7.0 The students should be able to describe the flow path for materials and waste relating to printing and reprographics.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

7.1 Recognize unit operations and flow of materials within a printing shop.

7.2 Describe the specific regulations and constraints that pertain to the industry.

7.3 Identify opportunities for hazardous waste minimization and source reduction in this industry.

7.4 Identify alternative materials to be used in this industry.

Unit 8. Plastics

General Outcome:

8.0 The students should be able to describe the flow path for materials and waste relating to plastics.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

8.1 Recognize unit operations and flow of materials within a plastics factory.

8.2 Describe the specific regulations and constraints that pertain to the industry.

8.3 Identify opportunities for hazardous waste minimization and source reduction in this industry.

8.4 Identify alternative materials to be used in this industry.

Unit 9. Paper and Pulp

General Outcome:

9.0 The students should be able to describe the flow path for materials and waste relating to paper and pulp.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 9.1 Recognize unit operations and flow of materials within a paper mill.
- 9.2 Describe the specific regulations and constraints that pertain to the industry.
- 9.3 Identify opportunities for hazardous waste minimization and source reduction in this industry.
- 9.4 Identify alternative materials to be used in this industry.

Unit 10. Auto and Marine Industries

General Outcome:

10.0 The students should be able to describe the flow path for materials and waste relating to the automobile and marine industries.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

10.1 Recognize unit operations and flow of materials within marinas and boat repair and construction facilities.

10.2 Recognize unit operations and flow of materials within automobile sales lots and repair facilities.

10.3 Describe the specific regulations and constraints that pertain to the industry.

10.4 Identify opportunities for hazardous waste minimization and source reduction in this industry.

10.5 Identify alternative materials to be used in this industry.