

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT 110 – POLLUTION PREVENTION

3 hours lecture, 3 units

Catalog Description

Study of various raw materials and chemicals used in industry and the changes that occur as they move through the industrial process. Topics include: applicable regulations; the material balance concept of inventory; the importance of waste minimization/pollution prevention; pollution and residential waste generation, reduction and prevention. Students will develop a waste source reduction plan.

Prerequisite

None

Course Content

- 1) Introduction to the methods of waste stream analysis
 - a. Sources of raw materials and their process
 - b. Fates of materials in industrial processes
 1. Products
 2. Losses: wastes and by-products
 - c. Energy considerations in industrial processes
 - d. Waste stream progression
- 2) Overview of waste minimization/pollution prevention
 - a. Current federal
 - b. Current state
 - c. County waste minimization plans
 - d. Local governments
- 3) Electroplating, metal finishing, chemical etching and printed circuit board production
 - a. Electroplating process
 1. Terminology
 2. Pre-treatment
 3. Electroplating
 4. Post-treatment
 5. Recovery/disposal of wastes
 - b. Metal finishing
 1. Purposes of metal finishing
 2. Chemicals and their uses in finishing
 3. Disposal of waste process solutions
 - c. Chemical etching
 - d. Printed circuit board production
 - e. Methods for reducing (eliminating) chemical and solid wastes
 - f. Facility planning to prevent pollution catastrophes
- 4) General manufacturing
 - a. Combined processes

- b. Importance of trade associations
 - c. Regulatory considerations
 - d. Case study
- 5) Printing and graphic reproduction
- a. Printing process
 - b. Applicable regulations
 - c. Case study: material balance
- 6) Auto service industry
- a. Overview of process and waste streams
 - b. Applicable regulations
 - c. Case study: material balance/minimization
 - d. Consumers role
- 7) Biotechnology
- a. Overview of process and waste streams
 - b. Applicable regulations
 - c. Case study: material balance/minimization
 - d. Government facilities
 - e. Private facilities
- 8) Processes in agriculture
- a. Pesticides and their applications
 - b. Fertilizers and their applications
 - c. Applicable regulations
 - d. Reduction of wastes
- 9) Source reduction programs
- a. Overview of plans/programs
 - b. Developing plans/programs
- 10) Survey of consumer services industry
- a. Auto sales/car washes
 - b. Dry cleaners/laundromats
 - c. Painting industry
 - d. Photo processing
 - e. Home repair
- 11) Residential hazardous waste generation/minimization/prevention
- a. Applicable regulations
 - b. Waste generation/reduction/prevention

Course Objectives

Students will be able to:

- 1) Describe and evaluate waste stream and hazardous materials generation.
- 2) Describe waste generator requirements and limitations.
- 3) Define and evaluate waste stream reduction and minimization methods.
- 4) Distinguish appropriate terms common to pollution prevention in industry.
- 5) Compare and contrast federal, state and local pollution prevention laws.
- 6) Describe agencies that regulate hazardous pollution and compliance.
- 7) Describe and apply waste stream reduction methods.
- 8) Describe pollution prevention requirements.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes, exams, written research paper, and oral presentation which measure students' ability to identify regulatory agencies, describe the processes of federal and local permitting, and describe and interpret the requirements of local, state, and federal pollution prevention laws.

Special Materials Required of Student

None

Minimum Instructional Facilities

Smart classroom

Method of Instruction

- 1) Lecture and discussion
- 2) Class projects

Out of Class Assignments

- 1) Reading assignments
- 2) Writing assignments
- 3) Projects
- 4) Reports

Texts and References

- 1) Required (representative example): *EHSM 110 Student Course Pack*, Latest Edition.
- 2) Supplemental: None

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Describe and evaluate waste stream generation and generator requirements.
- 2) Define waste stream reduction methods and pollution prevention requirements.
- 3) Identify applicable pollution prevention laws, regulations, standards and terms.