GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: WTRM 235 DIVISION: 50 ALSO LISTED AS:

TERM EFFECTIVE: Summer 2025 CURRICULUM APPROVAL DATE: 03/11/2025

SHORT TITLE: POLLUTION PREVENTION

LONG TITLE: Pollution Prevention

Units	Number of Weeks	Type	Contact Hours/Week	Total Contact Hours
3	18	Lecture:	3	54
		Lab:	0	0
		Other:	0	0
		Total:	3	54

Out of Class Hrs:	108.00
Total Learning Hrs:	162.00

COURSE DESCRIPTION:

Study of the raw materials and chemicals used in industry and the changes that occur as they move through the industrial process. Topics include: regulations, the materials balance concept of inventory, the importance of waste minimization/pollution prevention, and residential waste generation/reduction/prevention. This course has the option of a letter grade or pass/no pass.

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES
- L - Standard Letter Grade
- P - Pass/No Pass

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:
- 02 - Lecture and/or discussion
- 05 - Hybrid
- 71 - Dist. Ed Internet Simultaneous
- 72 - Dist. Ed Internet Delayed

STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Define, describe and evaluate waste streams and hazardous materials generation, requirements and limitations, and reduction and minimization methods.

2. Compare and contrast local, state and federal pollution prevention laws including the agencies that regulate hazardous pollution and compliance.

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Be able to distinguish appropriate terms common to the pollution prevention industry.

2. Be able to identify requirements of local, state and federal pollution prevention law and model waste minimization and pollution prevention methods. Define the 8

step method to implementing a pollution prevention program.

3. Explain the recovery and recycling process. Name some of the commonly used technologies for reuse and recycling in the electroplating industry

4. Explain the chemical industries pollution prevention performance. Describe pollution prevention opportunities and how they might be implemented in the chemical

industry. Explain how facility planning factors into pollution prevention.

5. Define general manufacturing and explain the importance of trade associations. List the sources of pollution prevention information.

6. Describe the history and the process as it relates to major waste streams, pollution prevention options and pollution prevention successes.

7. Define the industrial waste recycling process and List the local, state and federal regulations that govern this process.

8. Explain how biotechnology can effectively address issues pertaining to the monitoring, assessment, modeling and treatment of contaminated water, air and solid

waste streams. Explain several different bio-techniques now available. List any local, state and federal regulations that govern the process.

9. Identify various pollution prevention methods for pesticides and fertilizers used in agriculture. List any local, state and federal regulations that govern their process.

Investigate the conversion to sustainable agriculture.

10. Define source reduction and understand the life cycle of a selected product. State the elements that would be a part of developing and implementing a pollution

prevention plan/program.

11. Define the types of companies that are considered consumer service industries. Provide an understanding of each industry and state their typical waste streams.

12. Define the regulations that govern the safe disposal of hazardous waste. List the residential used materials that are considered hazardous waste and therefore

must be disposed of properly and discuss ways that residents can minimize the use of hazardous waste materials.

COURSE CONTENT:

Curriculum Approval Date: 03/11/2025

6 Hours

Content: Introduction to the methods of waste stream analysis - Sources of raw materials and their process. Fates of materials in industrial processes. Energy considerations in the industrial processes. Waste stream template.

Student Performance Objectives: Distinguish appropriate terms common to the pollution prevention industry. Name the types of chemicals used in Wood Furniture Manufacturing (WFM). Describe in detail the WFM process. List some of the major waste streams found in WFM. Name some of the pollution prevention options.

3 Hours

Content: Overview of waste minimization/pollution prevention - Local governments. County waste minimization plans. Current state and federal requirements.

Student Performance Objectives: Describe and interpret the requirements of local, state and federal pollution prevention laws. Describe and model waste minimization and pollution prevention methods. Discuss the 8 step method to implementing a pollution prevention program. Describe pollution prevention requirement

12 Hours

Content: Electroplating, metal finishing, chemical etching and printed circuit board production - Electroplating process. Metal finishing. Chemical etching. Printed circuit board production. Methods for reducing (eliminating) chemical wastes. Water conservation techniques. Facility planning to prevent pollution catastrophes. Case study.

Student Performance Objectives: Describe the electroplating process and its pollution prevention options. Explain the recovery and recycling process. Name some of the commonly used technologies for reuse and recycling in the electroplating industry. State what a typical recovery and recycle system for the metal finishing process tank involves. Review the chemical industries pollution prevention performance. Discuss pollution prevention opportunities and how they might be implemented in the chemical industry. Discuss the history of solvents. Describe the typical hierarchy when investigating solvent substitution options. Discuss various water conservation techniques for these industries. Explain how facility planning factors into pollution prevention.

3 Hours

Content: General manufacturing - Combined processes. Importance of trade associations. Regulatory considerations. Case study.

Student Performance Objectives: Define general manufacturing. Explain the importance of trade associations. List the sources of pollution prevention information. Discuss the life cycle design as it relates to general manufacturing.

4 Hours

Content: Printing and graphic reproduction - Printing process. Applicable regulations. Case study. Student Performance Objectives (SPO): Describe the history and the process. Discuss the Kraft Process as it relates to major waste streams, pollution prevention options and pollution prevention successes. List any local, state and federal regulations that govern the process.

6 Hours

Content: Auto service industry - Overview of process and waste streams. Applicable regulations. Consumers role. Case study

Student Performance Objectives: Describe the industrial waste recycling process. List the local, state and federal regulations that govern this process. Discuss the waste minimization philosophy and its implementation. State the consumers role in the process.

COURSE CONTENT(CONTINUED):

6 Hours

Content: Biotechnology - Overview of process and waste streams. Applicable regulations. Government facilities. Private facilities. Case study.

Student Performance Objectives: Describe how biotechnology can effectively address issues pertaining to the monitoring, assessment, modeling and treatment of contaminated water, air and solid waste streams.

Explain several different bio-techniques now available. List any local, state and federal regulations that govern the process.

3 Hours

Content: Processes in agriculture - Pesticides and their applications. Fertilizers and their applications. Applicable regulations. Reduction of wastes.

Student Performance Objectives: Identify various pollution prevention methods for pesticides and fertilizers used in agriculture. List any local, state and federal regulations that govern their process. Investigate the conversion to sustainable agriculture.

3 Hours

Content: Source reduction programs - Overview of plans/programs. Developing plans/programs.

Student Performance Objectives: Define source reduction. Discuss the life cycle of a selected product. State the elements that would be a part of developing and implementing a pollution prevention plan/program.

3 Hours

Content: Survey of consumer services industry - Auto sales/car washes. Dry cleaners/laundromats. Painting industry. Photo processing. Home repair.

Student Performance Objectives: List the types of companies that are considered consumer services industries. Provide an overview of each industry and state their typical waste streams. Explain several alternative pollution prevention options that they could utilize.

3 Hours

Content: Residential hazardous waste generation/minimization/prevention - Applicable regulations. Waste generation/reduction/prevention.

Student Performance Objectives: Describe the regulations that govern the safe disposal of hazardous waste. List the residentially used materials that are considered hazardous waste and therefore must be disposed of properly. Discuss ways that residents can minimize the use of hazardous waste materials.

2 Hours

Final Exam.

METHODS OF INSTRUCTION:

lecture, discussion, multimedia presentations, visual aids, field trips (as available)

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours 12

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Write a 1-2 page paper describing pollution prevention success stories.

Required Outside Hours 6

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Prepare an overview of waste reduction techniques leading to pollution prevention. Begin work on your waste source reduction plan.

Required Outside Hours 20

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Read the case study and complete the worksheet. Field Trip - visit an electronics based industry in the area to view their pollution prevention program and write a 2-3 page paper on their pollution prevention processes. Work on waste source reduction plan.

Required Outside Hours 6

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Read the case study and complete the worksheet. Research at least 3 sources of pollution prevention information.

Required Outside Hours 8

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Read the case study and complete the worksheet. Come prepared to discuss the Kraft Process in class. Work on your waste source reduction plan.

Required Outside Hours 12

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Read the case study and complete the worksheet. Field Trip - visit an auto manufacturing plant in the bay area to view their industrial waste recycling process.

Required Outside Hours 12

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Read the case study, complete the worksheet and come prepared to discuss with the class. Work on your waste source reduction plan.

Required Outside Hours 8

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Read the case study, complete the worksheet and come prepared to discuss with the class. Work on your waste source reduction plan.

OUT OF CLASS ASSIGNMENTS(CONTINUED):

Required Outside Hours 6

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations.

Required Outside Hours 6

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Complete your waste source reduction plan.

Required Outside Hours 6

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. Visit a local consumer services industry and come prepared to discuss with the class the type of pollution prevention methods they practice.

Required Outside Hours 6

Assignment Description

Read appropriate textbook chapter and/or course modules, provided handout material and/or review notes from class presentations. List the various hazardous waste items that you as a resident use, how you dispose of them and how you might reduce their us

METHODS OF EVALUATION:

Writing assignments

Evaluation Percent 30

Evaluation Description

Percent range of total grade: 20 % to 40 %

Written Assignments, Discussions

Other: Develop a waste source reduction plan.

Problem-solving assignments

Evaluation Percent 30

Evaluation Description

Percent range of total grade: 20 % to 30 %

Other: Review Case studies and Discussions

Objective examinations

Evaluation Percent 40

Evaluation Description

Percent range of total grade: 40 % to 60 %

Multiple Choice

True/False

Matching Items

REPRESENTATIVE TEXTBOOKS:

Advances in Water Treatment and Pollution Prevention or other appropriate college-level text, Editors: Sharma, Sanjay K. and Sanghi, Rashmi, Springer, 2012 or a comparable textbook/material.

Rationale: This is the current edition.

11th Grade Verified by: MS Word

RECOMMENDED MATERIALS:

Textbook option: Industrial Pollution Prevention Handbook by Harry M. Freeman or other appropriate college level text. The latest updated editions of the books are acceptable.

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Not Transferable

Not Transferable

UC TRANSFER:

Not Transferable

Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department:

CSU Crosswalk Course Number:

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: C

Maximum Hours:

Minimum Hours:

Course Control Number: CCC000573910

Sports/Physical Education Course: N

Taxonomy of Program: 095800