

ENGR M35: SOLID WASTE AND HAZARDOUS WASTE MANAGEMENT

Originator

Scarlet Relle

College

Moorpark College

Attach Support Documentation (as needed)

Attach 1 - About VC Innovates.pdf

Attach 8 - Big Future - College Search.pdf

Attach 2 - VC Innovates _ Engineering and Architecture.pdf

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Discipline (CB01A)

ENGR - Engineering

Course Number (CB01B)

M35

Course Title (CB02)

Solid Waste and Hazardous Waste Management

Banner/Short Title

Solid Waste & Hzrd Waste Mgmt

Credit Type

Credit

Honors

No

Start Term

Spring 2020

Catalog Course Description

Provides students with a working knowledge of solid waste and hazardous waste management practices including waste generation, minimization, transport, treatment, recycling, storage, and disposal. Identifies and explains the applicable federal, state, and local regulatory policies. Assesses the consequences of these regulations, and the various waste management practices, on the public health and safety as well as environmental sustainability. Surveys waste management techniques pertaining to plastic wastes, biomedical wastes, and electronic wastes. Draws examples and assignments from practical applications in the field of environmental engineering.

Additional Catalog Notes

This course is part of a Certificate in Environmental Engineering Technology.

Taxonomy of Programs (TOP) Code (CB03)

0924.00 - *Engineering Technology, General (requires Trigonometry)

Course Credit Status (CB04)

D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)

B (Transferable to CSU only)

Course Basic Skills Status (CB08)

N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)

C - Clearly Occupational

Course Cooperative Work Experience Education Status (CB10)

N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)

N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)

Y - Not Applicable

Course Noncredit Category (CB22)

Y - Credit Course

Funding Agency Category (CB23)

Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)

1 - Program Applicable

General Education Status (CB25)

Y - Not Applicable

Support Course Status (CB26)

N - Course is not a support course

Field trips

May be required

Faculty notes on field trips; include possible destinations or other pertinent information

Destinations may include waste management and hazardous waste management sites near the college or near students' place of residence.

Grading method

Letter Graded

Alternate grading methods

Student Option- Letter/Pass

Does this course require an instructional materials fee?

No

Repeatable for Credit

No

Is this course part of a family?

No

Units and Hours

Carnegie Unit Override

No

In-Class

Lecture

Minimum Contact/In-Class Lecture Hours

52.5

Maximum Contact/In-Class Lecture Hours

52.5

Activity**Laboratory****Total in-Class****Total in-Class****Total Minimum Contact/In-Class Hours**

52.5

Total Maximum Contact/In-Class Hours

52.5

Outside-of-Class**Internship/Cooperative Work Experience****Paid****Unpaid****Total Outside-of-Class****Total Outside-of-Class****Minimum Outside-of-Class Hours**

105

Maximum Outside-of-Class Hours

105

Total Student Learning**Total Student Learning****Total Minimum Student Learning Hours**

157.5

Total Maximum Student Learning Hours

157.5

Minimum Units (CB07)

3

Maximum Units (CB06)

3

Prerequisites

ENGR M33

Entrance Skills**Prerequisite Course Objectives**

ENGR M33-demonstrate an understanding of local and global environmental management issues and applicable federal, state, and local laws and standards.

ENGR M33-discuss and apply the relevant physical, chemical, and biological principles fundamental to the practice of environmental engineering as they relate to the management of soil, water, and air quality and solid and hazardous waste.

ENGR M33-discuss, analyze, and select a proper soil, water, and air pollution control method or waste management practice while considering impacts on human health and the environment.

Requisite Justification**Requisite Type**

Prerequisite

Requisite

ENGR M33

Requisite Description

Credit program requisite (credit only)

Level of Scrutiny/Justification

Content review

Student Learning Outcomes (CSLOs)**Upon satisfactory completion of the course, students will be able to:**

- | | |
|---|---|
| 1 | select a proper waste treatment methodology considering the impacts on human health and the environment. |
| 2 | identify applicable federal, state, and local laws and regulations for generation and management of solid and hazardous wastes. |

Course Objectives**Upon satisfactory completion of the course, students will be able to:**

- | | |
|---|---|
| 1 | demonstrate an understanding of various solid waste and hazardous waste categories and characteristics. |
| 2 | develop a working knowledge of present-day solid waste and hazardous waste management practices. |
| 3 | discuss, analyze, and select the proper waste treatment technology considering impacts on human health and the environment. |
| 4 | identify applicable federal, state, and local regulations and employ compliant waste generation and management practices. |

Course Content**Lecture/Course Content****3% - Definition, sources, and characteristics of solid waste:**

- Classification
- Quantity
- Physical, chemical, and mechanical properties

10% - Introduction to solid waste management:

- Minimization
- Collection
- Transport
- Treatment
- Recycling
- Reusing
- Land disposal

12% - Introduction to various technologies of waste treatment:

- Composting
- Anaerobic digestion
- Thermal treatment

8% - Socioeconomic, health, and environmental considerations of:

- Solid waste generation
- Minimization
- Treatment
- Disposal

10% - Regulations regarding solid waste:

- Generation
- Transportation
- Storage
- Treatment
- Disposal

2% - Definition, sources, categories, and characteristics of hazardous waste**10% - Cradle-to-grave management process of hazardous waste:**

- Generation
- Transportation
- Recycling
- Treatment
- Storage
- Disposal

12% - Introduction to various technologies of hazardous waste treatment:

- Biological
- Thermal
- Physicochemical processes

8% - Socioeconomic, health, and environmental considerations of:

- Hazardous waste generation
- Minimization
- Treatment
- Disposal

10% - Regulations regarding hazardous waste:

- Generation
- Transportation
- Storage
- Treatment
- Disposal

15% - Survey of specialty waste management practices and regulations for:

- Plastic wastes
- Biomedical wastes
- Electronic wastes

Laboratory or Activity Content

Not applicable.

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises
Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Essay exams
Group projects
Individual projects
Objective exams
Oral presentations
Quizzes
Reports/papers
Research papers

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations
Computer-aided presentations
Collaborative group work
Class activities
Class discussions
Case studies
Distance Education
Field trips
Group discussions
Guest speakers
Instructor-guided interpretation and analysis
Internet research
Lecture

Describe specific examples of the methods the instructor will use:

Guest speakers from the waste management industry will visit the classroom and present on a relevant topic. Instructional videos regarding waste generation, transportation, recycling, and treatment will be shown in the classroom. Case studies regarding improper hazardous waste management practices will be discussed in the classroom. Powerpoint presentations and handouts will be used for lecturing and group activities.

Representative Course Assignments

Writing Assignments

1. Answer concept questions from lectures. An example would be: Name and explain the 4 characteristics that render waste as hazardous.
2. Document engineering design solutions. An example would be: Write a cradle-to-grave hazardous waste management procedure pertaining to some type of electronic waste such as electric toys, mobile phones, computer monitors, etc.
3. Write a hazardous waste manifest. An example would be: Complete a Hazardous Waste Transportation application packet for transporting medical waste from a hospital to a biomedical disposal facility.

Critical Thinking Assignments

1. Analyze waste management problems, synthesize solutions, and critically evaluate the results. An example would be: The number one most common type of garbage that is found in the environment, particularly in the oceans, are cigarette butts. Pick a country that produces a lot of cigarette butts, and based on what you have learned in this class and considering the resources and the socioeconomics of your chosen country, devise a waste management strategy that could effectively handle this environmental waste problem.
2. Compare and contrast solid waste generation, treatment, and disposal techniques between developed and developing nations. An example would be: Compare and contrast the electronic waste management methods in the United States and China taking into account yearly waste production amounts, methods of collection, storage, recycling, treatment, disposal, and the various governing laws and regulations.
3. Synthesize a novel waste management technique and justify its use. An example would be: Considering the various types of plastic waste treatment techniques that you have learned in this class, combine 2 or 3 of those techniques to synthesize a novel approach. Justify the effectiveness of your novel technique according to scientific and engineering principles.

Reading Assignments

1. Read sections of the Solid Waste Disposal Act amended by the US Congress in 2019 and identify which standards are applicable to generators of hazardous waste.
2. Read the "California: Final Authorization of State Hazardous Waste Management Program Revision" and compare it to the same document for the State of Hawaii. Discuss the reasons for the identified similarities and differences in the laws regarding Hazardous Waste Generation and Disposal.

Outside Assignments

Representative Outside Assignments

1. Conduct library and/or Internet research to gather information and prepare a group presentation on some type of environmental disaster due to negligent release or improper disposal of hazardous chemicals. An example would be: Prepare a group presentation on the Love Canal environmental disaster. Include in your presentation a historical perspective of Love Canal's discovery, the hazardous chemicals involved, their adverse effects on human health and the environment, and the hazardous waste treatment techniques used for clean-up of this site.
2. Participate in a field trip pertaining to solid waste or a hazardous waste industry and write a report. An example would be: Prepare a field trip report of your visit to the plastic recycling facility. Include in your report the name and address of the business, the name and job title of your tour guide, a visual reference or a layout map of the recycling facility, and a step-by-step description of what happens to plastic wastes as they enter the recycling facility.
3. Use the Internet to explore and learn about the various federal, state, and local agencies that oversee solid and hazardous waste management practices. An example would be: Conduct a search on www.ca.gov and www.epa.gov to find out what household wastes are considered "hazardous" and are thus banned from our trash cans. Then choose one of those household wastes and prepare a presentation focusing on the various regulatory agencies which dictate laws and regulations pertaining to the characterization, generation, transportation, treatment and disposal of this particular household waste.

Articulation

Equivalent Courses at other CCCs

College	Course ID	Course Title	Units
Allan Hancock College	ENVT 101	Introduction to Environmental Hazardous Materials	3
Allan Hancock College	ENVT 158	Hazardous Waste Minimization and Emission Reduction	1
Allan Hancock College	ENVT 159	Hazardous Materials and Hazardous Waste Permitting	1
Rio Hondo College	ET 110	Hazardous Waste Generation/Reduction/Treatment	3

Rio Hondo College	ET 150	Hazardous Waste Management Applications	4
Rio Hondo College	ET 240	Solid Waste Management Applications	4

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

Course is CSU transferable

Yes

CSU Baccalaureate List effective term:

Spring 2020

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

UC TCA

UC TCA

Denied

Date Proposed:

6/4/2019

Date Denied:

7/3/2019

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type

Textbook

Description

Rao, M.N., et al. Solid and Hazardous Waste Management: Science and Engineering. Elsevier, 2016.

Resource Type

Textbook

Description

Woodside, Gayle. Hazardous Materials and Hazardous Waste Management. 2nd ed. Wiley, 1999.

Resource Type

Textbook

Description

Christensen, Thomas, ed. Solid Waste Technology and Management, 2 Volume Set. Wiley, 2010.

Library Resources

Assignments requiring library resources

Research using the Library's print and online resources to gather information and prepare a written and oral report on an environmental disaster due to negligent release or improper disposal of hazardous chemicals.

Sufficient Library Resources exist

Yes

Distance Education Addendum

Definitions

Distance Education Modalities

100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Instructor will post a case study regarding hazardous waste generation and management and will ask students to comment on the appropriate use of technology for waste minimization and disposal.
E-mail	Instructor will email students with announcements about the course or an upcoming event. Students, in turn, may email the instructor with their questions or concerns. Students will email their programs and projects the instructor.
Face to Face (by student request; cannot be required)	Students will have the option to meet the instructor to receive one-on-one help from the instructor.
Other DE (e.g., recorded lectures)	Instructor may record the lectures and post them for students to view within a specified time frame to be ready for the accompanying assignments. Students will upload their assignments and projects to the course webpage.
Synchronous Dialog (e.g., online chat)	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via an online chat.
Telephone	Instructor may provide a phone number for the students where they can leave a voicemail and expect a call back within 24 hours.
Video Conferencing	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via live video conferencing.

Primary Minimum Qualification

ENGINEERING TECHNOLOGY

Review and Approval Dates

Department Chair

0/23/2019

Dean

01/23/2019

Technical Review

01/31/2019

Curriculum Committee

02/05/2019

DTRW-I

09/12/2019

Curriculum Committee

MM/DD/YYYY

Board

10/08/2019

CCCCO

10/28/2019

Control Number

CCC000608836

DOE/accreditation approval date

MM/DD/YYYY