

1. CEE 4410 (5410) – Solid and Hazardous Waste Management
2. Course credit hours: 3
 Contact hours per week: 3
 Credit category: Engineering Topics
3. Course coordinator: Julia B. Avera
4. Textbook: None

Supplemental materials: LaGrega, Buckingham and Evans, Hazardous Waste Management, Second Edition, Waveland Press, Inc., Long Grove, Illinois (2001)

5. Course information:

2020 Catalog description	The collection and disposal of solid wastes. Treatment and disposal technologies of hazardous wastes.
Prerequisite(s)	CEE 3413 or consent of instructor
Course type	Selected Elective

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Report the basic tenets of the rules and laws governing municipal solid waste in Tennessee	4
CO2	Relate the sources, types, composition and properties of municipal solid wastes	1, 2
CO3	Relate the methods for collecting, processing and transporting municipal solid wastes	1, 2
CO4	Relate the components and methodology for the design of municipal solid wastes landfills	1, 2
CO5	Report the basic tenets of the rules and laws governing hazardous waste in Tennessee	1, 2
CO6	Relate the basic fates and transport mechanisms for hazardous wastes in the environment	1, 2
CO7	Describe toxicology and environmental audits	4
CO8	Relate the basic characteristics of hazardous waste stabilization and treatment methods	1, 2
CO9	Describe the process of the remediation of hazardous waste sites	1, 2

ABET criterion 3 Student Outcomes addressed by this course:

SO No.	Student Outcome (SO)
3.1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

3.2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3.4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

7. Course topics:

1. General introduction (1 class)
2. Terms, definitions and evolution of municipal solid waste management (1 class)
3. Laws and regulations governing municipal solid waste management (1 classes)
4. Sources, types and composition of municipal solid waste (1 classes)
5. Physical, chemical and biological properties of municipal solid waste (1 class)
6. Solid waste generation and collection rates (1 class)
7. Separation, processing and recycling solid waste (1 class)
8. Solid waste transfer and transportation (1 class)
9. Landfill method of solid waste disposal (2 classes)
10. Terms, definitions and evolution of hazardous waste management (1 classes)
11. Laws and regulations governing hazardous waste management (2 classes)
12. Fate and transport of hazardous wastes in the environment (2 classes)
13. Toxicology (1 class)
14. Environmental audits (1 class)
15. Hazardous waste stabilization and treatment techniques (2 classes)
16. Risk assessment (1 class)
17. Hazardous waste site remediation (2 classes)
18. Field trips and guest speakers (5 classes)
19. Testing and assessment (3 classes)

Program criteria (curriculum) addressed by this course:

1. Apply knowledge of four technical areas appropriate to civil engineering
2. Design a system, component or process in at least two civil engineering contexts

8. Additional topics, assignments, or requirements for dual-level (4000/5000) course:
Graduate students will prepare and give a 45minute presentation over a given topic related to solid and hazardous waste.

9. Date: 01/24/2020