
DEPARTMENT OF CIVIL AND CONSTRUCTION ENGINEERING
SCHOOL OF ENGINEERING
COURSE SYLLABUS

COURSE TITLE: Hazardous Waste
Engineering

TERM: Summer
YEAR: 2013

COURSE: CE 4708
SECTION NO.: 001

TIME: Online/Hybrid TR 6:00-7:50 pm
PLACE: M-135/On-line

INSTRUCTOR: Dr. M. A. Karim, P.E.
Assistant Professor

OFFICE LOCATION: M-162B

OFFICE HOURS: On-line + TR 5:00 – 6:00 pm
MW 3:00 – 4:30 pm
*Other hours by email

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E-MAILS: mkarim@spsu.edu
makarim@juno.com

DEPARTMENTAL PHONE: (678) 915-4220; **MY WEBSITE:** <http://educate.spsu.edu/mkarim>

NUMBER OF CREDIT HOURS: 3-0-3 (Lecture-Lab-Total)

PREREQUISITS: CE 3703 (Environmental Engineering II) or Instructor's Permission

COREQUISITS: None.

COURSE CATALOG DESCRIPTION: A study of hazardous waste regulation, treatment, disposal, and remediation of contaminated sites. Evaluation of unit operations and processes of importance in the treatment and disposal of common organic and inorganic hazardous wastes.

REQUIRED or ELECTIVE: Elective.

REQUIRED TEXT: **Hazardous Waste Management** by Michael D. LaGrega, P. L. Buckingham, J. C. Evans, and Environmental Resources Management, Waveland Press, Inc., Current Edition (2nd Edition, ISBN: 1-57766-693-3 or 978-1-57766-693-6, 2001).

REFERENCES: None.

SUPPLEMENTAL READINGS: **RCRA Orientation Manual**, Developed by EPA Office of Solid Waste/Communications, Information, and Resources Management Division, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460. It can be found online at <http://www.epa.gov/epaoswer/general/orientat/>

OTHER MATERIALS: Additional handouts may be provided as needed for face-to-face options. It is recommended that students take notes in a three ring binder since they may be receiving handouts throughout the semester. **SPSU email** and GeorgiaView **Desire2Learn (D2L)** systems will be used for messages and content delivery, respectively. Students should access these sites regularly.

COURSE LEARNING OUTCOMES: Upon successful completion of this course, students shall be able to:

1. Define, identify, classify, and characterize the hazardous waste;
2. Interpret and discuss the issues and legislations related to hazardous waste management;
3. Recognize and analyze the toxic effect and the risk of hazardous waste;
4. Analyze and design the physicochemical treatment processes for hazardous waste;
5. Recognize in-situ and ex-situ biological treatment processes and analyze and design of biological treatment processes of hazardous waste;
6. Discuss the concept of stabilization and solidification of hazardous waste and gain the knowledge of different USEPA test methods used for hazardous waste stabilization and solidification;
7. Comprehend the concepts of hazardous waste treatment by thermal processes; and
8. Identify the hazardous waste landfill design parameters, recognize the materials used in hazardous waste landfill construction, and explain the operation, closure and post-closure requirements of hazardous waste landfill.

COURSE REQUIREMENTS:

1. **Computer Requirements:** Students will need a working computer with internet connection, headphone, and microphone for attending live group or class room meetings in Wimba Classroom /Go to Meetings. Students are encouraged to logon to GeorgiaView Desire 2 Learn (D2L) daily basis to keep up with the course requirements and finish the weekly task by the end of each week.
2. **Student Responsibility:** Distance learning requires more individual discipline than traditional classes, and requires that students have at least some control over their time and schedule. It is not easier or less time than face-to-face courses. Students may need to spend 5 -7 hours each week to complete the necessary tasks. Students are supposed to start with watching the course introduction [video](#) and [reading](#) the syllabus, and then [taking](#) the syllabus quiz. Until the students take the syllabus quiz and score 90% or more, the subsequent modules/topics will not show up in the course content for his/her review and use. The students will have up to 5 attempts for the syllabus quiz. Also students are suggested to be familiar with the NCEES FE Exam [Handbook](#) that is part of the Welcome module. Students may need to use this document throughout the semester. Students can print the Environmental Engineering section of the Handbook and keep it with him/her during the study. Students are suggested to review the announcements and calendar events daily that may be posted in D2L.
3. **Netiquette:** The rules of behavior in the internet. Please review the netiquette provided in the link, <http://www.education.com/reference/article/netiquette-rules-behavior-internet/> and follow it closely throughout the semester.

4. **Homework:** Homework may be assigned for this course. Homework assignments must be finished, scanned in pdf with a file name as “HW#2-LastName.pdf” (example name for 2nd homework) and submitted in the corresponding dropbox by the end of the week and any other date assigned by the instructor. Late homework WILL NOT be accepted. Exceptions may be considered in case of illness, serious emergencies, or other university sponsored activities. However, appropriate evidence must be presented in order to qualify for exceptions. Show the detail works for full credit.
5. **Quizzes:** All quizzes will be at the end of each module that the students have to complete. Quiz questions are randomly selected from a question library for each topic and each question carries 2 points. Quiz will be available for two to three days at the end of the Module week and two attempts will be allowed for each quiz. Time allowed for each quiz is 45 to 60 minutes. NO make-up quizzes will be given. Exceptions may be considered in case of illness, serious emergencies, or other university sponsored activities. However, appropriate evidence must be presented in order to qualify for exceptions.
6. **Exams:** There will be two exams: one **Midterm** and one **Final**. All exams will be proctored and closed book unless advised otherwise. Students have to come to SPSU campus to take the exams. Out of town students have to arrange a proctor and an exam facility approved by the course instructor. The date of the exam will be posted in D2L as an announcement and in D2L Calendar. NO make-up exams will be given. Exceptions may be considered in case of illness, serious emergencies, or other university sponsored activities. However, appropriate evidence must be presented in order to qualify for exceptions.
7. **Discussion/Chat:** Discussion/chat may be assigned for the course. If so, the topics will be selected and posted in D2L each week. Students need to participate and respond and/or create new topic for discussion/chat to receive the grades assigned for discussion/chat.
8. **Honor Code:** SPSU has an Honor Code and a procedure for handling cases when academic misconduct is alleged. All students should be aware of them. Information about the Honor Code and the misconduct procedure may be found at <http://www.spsu.edu/honorcode/>.
9. **ADA Provisions:** “Students with disabilities, as defined by the Americans with Disabilities Act (ADA) of 1990, should contact the instructor during the first week of the semester regarding the accommodations necessary to complete the requirements of this course. The instructor, with the help of SPSU, will make reasonable adjustments to take into consideration the specific handicap of each student covered under the ADA.” The students can also contact SPSU ADA coordinator at 678-915-7244 for additional help.”
10. **Communications, Grading, and Response Timeframe:** The best way to communicate with me is by email, then by telephone. Grading of homeworks/ assignments may take up to a week. I will try to respond to any discussions/ comments/ questions within 24 hours. However, I may not be available during the weekend.
11. **Contacts to get Help:**
 - For D2L Technical Support, go to <http://spsu.edu/d2l>

- For Wimba Technical Support, go to <http://www.wimba.com/services/support/>
- SPSU Help Desk Phone Number: (678) 915-HELP(4357).

GRADING POLICY: All exams, quizzes, and assignments must be completed satisfactorily in order to pass the course. The evaluation process described below is subject to change by the instructor. The changes will be announced in the class.

<u>Class Work:</u>		<u>Total Grade:</u>			
1. Homework	- 10%	<u>Scale, Letter Grade, and GPA</u>			
2. Quiz	- 30%	90%	- 100%	A	4.0 (Excellent)
3. Midterm Exam	- 25%	80%	- 90%	B	3.0 (Good)
4. Final Exam	- 30%	70%	- 80%	C	2.0 (Satisfactory)
5. Discussion/Chat	- 5%	60%	- 70%	D	1.0 (Passing)
			< 60%	F	0.0 (Failure)
		--	--	WF	0.0 (Withdrawn after deadline)
TOTAL	- 100%				

The following symbols are approved for use in the cases indicated, but will not be included in the determination of the grade point average.

"I" This symbol indicates that the student was doing satisfactory work but, for non-academic reasons beyond his control, was unable to meet the full requirements of the course. The requirements for removal of an "I" are left to the respective institutions; however, if an "I" is not satisfactorily removed after three quarters of residence, the symbol "I" will be changed to the grade "F" by the appropriate official. (See Southern Tech policy - Removal of an Incomplete "I", on page 2).

"W" This symbol indicates that a student was permitted to withdraw without penalty. Withdrawals without penalty will not be permitted after the mid-point of the total grading period (including final examinations) except in cases of hardship as determined by the appropriate official of the respective institution.

"V" This symbol indicates that a student was given permission to audit this course. Students may not transfer from audit to credit status or vice versa.

"K" This symbol indicates that a student was given credit for the course via a credit by examination program approved by the respective institution's faculty (CLEP, AP, Proficiency, etc.)

SCHEDULE: Hybrid/On-Line.

TENTATIVE MODULE TOPIC/OUTLINE (10-Week Semester): The following module topics/outlines are subject to change by the instructor. The changes, if any, will be announced in D2L.

Class/ Module	Tentative Module Topic/Outline	Chapter
Module 1 (Week 1)	Fundamentals of Hazardous Waste (HW): HW definition, identification, historical roots, classification, generation, and contaminated sites.	Chapter 1
Module 2 (Week 2)	Legal Framework of HW Management: Environmental law, Resource Conservation and Recovery Act (RCRA), Federal HW Regulations under RCRA.	Chapter 2
Module 3 (Week 3)	Toxicology: Exposure, toxic effects, dose-response relationships, non-carcinogens, carcinogens, & ecotoxicology.	Chapter 5
Module 4 (Week 4)	Physicochemical Treatment of HW: Air stripping, carbon adsorption, stream stripping, chemical oxidation, and membrane process.	Chapter 9
Week 4	Midterm Exam - On Campus – Tuesday, June 18, 2013 at 6:00 pm, M-135	----
Module 5 (Week 5 & 6)	Biological Treatment of HW: Basics of microbial metabolism, growth kinetics, <i>ex-situ</i> treatment of liquids, slurry-phase, solid-phase, and vapor-phase, <i>in-situ</i> biological treatment systems – natural attenuation, and enhanced biodegradation.	Chapter 10
Module 6 (Week 7)	Stabilization and Solidification of HW: Mechanisms, technology, testing, field implementation, and design.	Chapter 11
Module 7 (Week 8)	Thermal Treatment of HW: Regulations, combustions, gases & vapors, liquid injection incinerators, solid waste incineration, storage & feed systems, air pollution control, trial burns, etc.	Chapter 12
Module 8 (Week 9 & 10)	Land Disposal of HW: Landfill operations, site selection, liner & leachate collections systems, daily, intermediate, and final cover systems, materials, contaminant transport through landfill barriers, landfill stability, and closure & post-closure care.	Chapter 13
Week 11	FINAL EXAM – Comprehensive - On-Campus – Tuesday, July 30, 2013 at 6:00 pm, M-135	---