CE 4708-01 – Hazardous Waste Engineering

Instructor Details

Instructor: Dr. Amy Borello Gruss
Office: L-158
Office Hrs: Tues: 11 am – 2 pm
            Wed: 10 am – 12:30 pm
Email Address: agruss@kennesaw.edu

Course Details

Term: Spring 2020
Classroom: 95% Online
Class Time: 95% Online
Credit Hours: 3-0-3 (Lecture-Lab-Total)
Prerequisites: CE 3702

COURSE DESCRIPTION: Students examine the definition, characterization, classification, regulation, treatment, and disposal of hazardous waste. Evaluation of unit operations and processes of importance in the treatment and disposal of common organic and inorganic hazardous wastes are also covered.

REQUIRED or ELECTIVE: Required

REQUIRED TEXT:

(2) NCEES: FE Reference Handbook. This text can also be downloaded for FREE in the provided link below (http://ncees.org/exams/study-materials/download-fe-supplied-reference-handbook/).

OTHER MATERIALS:


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/

ELECTRONIC COMMUNICATIONS: The University provides all KSU students with an “official” email account with the address “students.kennesaw.edu.” As a result of federal laws protecting educational information and other data, this is the sole email account you should use to communicate with your instructor or other University officials.

Communications, Grading, and Response Timeframe: The best way to communicate with me is by KSU email. Grading of homeworks/assignments may take up to a week. I will try to respond to any discussions/comments/questions by the close of the following business day.
**COURSE LEARNING OUTCOMES:** Upon successful completion of this course, students shall be able to: [Program Student Outcome – PSO]
1. Explain the characteristics of hazardous waste (Covered in Topic 1). [1]
2. Interpret the issues and legislations related to hazardous waste management (Covered in Topic 2). [7]
3. Recognize and analyze the toxic effect and the risk of hazardous waste (Covered in Topic 3). [4]
4. Analyze and design the physicochemical treatment processes for hazardous waste (Covered in Topic 4). [1, 2]
5. Recognize in-situ and ex-situ biological treatment processes and analyze and design of biological treatment processes of hazardous waste (Covered in Topic 5). [1, 2]
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 (Covered in Topic 6). [1]
7. Describe the concepts of hazardous waste treatment by thermal processes (Covered in Topic 7). [1]
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 (Covered in Topic 8). [1, 2]

**COURSE REQUIREMENTS:**

1. **Attendance Policy:** No in-class attendance is necessary as it is an on-line class. However, students have to log-on into D2L regularly to complete all the required work daily/weekly basis as assigned. Advance notice of a non-availability on-line due to limited internet access should be provided whenever possible. Advance notice of an absence should be provided whenever possible. However, this is an on-line course, so no need to attend the class on-campus. Makeup experiments, exams, quizzes, and acceptance of late assignments/reports will be considered only for documented medical reasons, real emergency circumstances, or other university sponsored activities. The students are solely responsible for managing their enrollment status in this course. Nonattendance in on-line activities does not constitute a withdrawal from the course.

2. **Minimum Technical Skills:** Using D2Lcourse management system, sending and receiving emails with attachments, creating, scanning and submitting files in commonly used formats such as .docx, .xlsx, .pptx, and/or .pdf, downloading and installing software, and using words, spreadsheet, and presentation programs.

3. **Computer Requirements:** Students will need a working computer with internet connection, headphone, and microphone for attending live group or class room meetings in Blackboard Collaborator Classroom /Go to Meetings. Students are encouraged to logon to Desire 2 Learn (D2L) Brightspace daily basis to keep up with the course requirements and finish the weekly task by the end of each week.

4. **Student Responsibility:** Distance learning with on-line course 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 - 8 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 75% 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.

5. **Netiquette:** The rules of behavior in the internet. Please review the netiquette provided in the link [here](#), and follow it closely throughout the semester.

6. **Turnitin:** Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use posted on the Turnitin.com site.

7. **Homework:** Homework may be assigned for this course. Homework assignments must be finished, scanned in pdf with a file name as “LastNameFirstName_HW#2.pdf” (example name for 2nd homework for John Smith is SmithJ_HW#2.pdf) and submitted in the corresponding assignment folder (or dropbox) by the end of the week and/or any other date assigned by the instructor. Assignment Folder/Dropbox will show the due date in D2L. 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.

8. **Quizzes:** All quizzes will be at the end of each module/topic 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 one or two attempts will be allowed for each quiz. Time allowed for each quiz is 45 to 60 minutes depending on the size of the quiz. 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.

9. **Exams:** There will be two/three exams: one/two midterms and one Final. All midterm exams are on-line and the final will be proctored in a class room and closed books and notes unless advised otherwise. Students have to come to KSU Marietta campus to take the final exam. Out of town students, if any, have to arrange a proctor and an exam facility approved by the course instructor at their own cost. 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. If you are taking the course from off-site location (out of Marietta area), please select a proctor in a nearby institution/organization and let me know. I will communicate with your selected
proctor/institution and they will proctor all the exams for you. **No formula sheets will be provided or allowed. However, students are required to have a hard copy of the current NCEES FE Exam Handbook or print it from the NCEES website, if available.**

10. **Calculator Use Policy:**
   - **Casio:** All fx-115 models. Any Casio calculator must contain fx-115 in its model name. Examples of acceptable Casio fx-115 models include (but are not limited to): fx-115 MS, fx-115 MS Plus, fx-115 MS SR, fx-115 ES, fx-115 ES Plus.
   - **Hewlett Packard:** The HP 33s and HP 35s models, but no others.
   - **Texas Instruments:** All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name. Examples of acceptable TI-30X and TI-36X models include (but are not limited to): TI-30Xa, TI-30Xa SOLAR, TI-30Xa SE, TI-30XS Multiview, TI-30X IIB, TI-30X IIS, TI-36X II, TI-36X SOLAR, TI-36X Pro.

11. **Discussion/Chat:** Discussion/chat may be assigned for the course. If so, the topics will be selected and posted in D2L each week or as assigned. Students need to participate and respond and/or create new topic for discussion/chat to receive the grades assigned for discussion/chat.

12. **Term Paper/Presentation:** No term paper/presentation is assigned for this course.

13. **What is Plagiarism?** KSU defines Plagiarism as the practice of taking someone else’s work or ideas and passing them off as one’s own. When unaware or uncertain on how to properly cite a particular source, please do not neglect to add the citation — KSU considers not doing so as plagiarism. If you have questions on how to cite your work, please contact me immediately! For more information, please refer to the “Plagiarism Policy” under the Policies section of this syllabus.

14. **Plagiarism Policy:** KSU considers committing plagiarism as an act of academic dishonesty, and takes all occurrences very seriously. Any instances where academic dishonesty is suspected will result in an automatic grade of a zero for all students involved. The instructor reserves the right to remove any student from the class if the student’s behavior is of a disruptive nature or if there is an evidence of academic dishonesty. Further disciplinary action may be taken such as suspension or expulsion from the University.

15. **FERPA:** The Family Education Rights and Privacy Act (FERPA) is a federal law designed to protect the privacy of educational records by limiting access to these records, and precludes Southern Polytechnic State University from providing information regarding the student to anyone without written authorization. Examples of records not released are grades; grade point average; the specific number of hours/credits enrolled, passed, or failed; Social Security Number; student ID number; name of parents or next of kin; and/or residency status.

16. **Ethics and Sexual Harassment Policy:** Sexual harassment in any situation is reprehensible. It subverts the mission of the University, and threatens the careers of students, faculty, and staff. It is viewed as a violation of Title VII of the 1964 Civil Rights Act as amended by the 1991 Civil Rights Act. Sexual harassment will not be tolerated at KSU. KSU is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, religion, color, sex, national origin, disability, age, sexual orientation,
or veteran status. In adhering to this policy, the University abides by the requirements of Title IX of the Education Amendments of 1972; by Title VII of the Civil Rights Act of 1964, as amended by the Civil Rights Acts of 1991; by Sections 504 and 504 of Rehabilitation Act of 1973; by Executive Order 11246, as amended by 38 U.S.C. 2012; the Vietnam Era Veterans Readjustment Assistance Act of 1972, as amended; and by other applicable statutes and regulations relating to equality of opportunity. This policy on sexual harassment applies to the entire University and to the conduct of students, faculty, and staff alike.

17. **Student Rights and Responsibilities**: Students of KSU are entitled to an environment that is conducive to learning and individual growth. To this end, students enrolling at KSU assume a responsibility to abide by the policies and regulations expressed in this section. By doing so, students may fulfill their responsibilities and enjoy the exercise of their own rights while also respecting the rights of others. Information about the student rights and responsibilities can be found here.

18. **Academic Honesty/Integrity**: KSU has an academic honesty/integrity and a procedure for handling cases when academic misconduct is alleged. All students should be aware of them. Information about the academic honesty/integrity and the misconduct procedure can be found here.

19. **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 KSU, will make reasonable adjustments to take into consideration the specific handicap of each student covered under the ADA.” The students can also contact KSU Marietta Campus ADA coordinator at (470) 578-2666 for additional help.”

20. **Communications, Grading, and Response Timeframe**: The best way to communicate with me is by KSU email, then by telephone. Grading of homework/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 and/or if I am in a vacation and official tour.

21. **Grade Dispute/Appeal**: Final grade dispute/appeal must be submitted within a week of the final exam. The procedure has been outlined in the KSU website that can be accessed via the link here.

22. **Institutional Policies**

   **Federal, BOR, & KSU Course Syllabus Policies**

   Information contained in the links below constitutes the Federal, BOR, and KSU course syllabus policies and procedures and may be referenced by faculty members in their course syllabi. These policies are updated on the Academic Affairs Website annually.

   **Academic Affairs - Federal, BOR, & KSU Policies**

   **Academic Affairs - KSU Student Resources for Syllabus**

   Note to Faculty and Students: The Office of the Provost will work to keep the policies and links in this document as accurate as possible.

   *Academic Integrity Statement (following page)*
Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section 5c of the Student Code of Conduct addresses the university’s policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/ falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an “informal” resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct’s minimum one semester suspension requirement. See also KSU Student Code of Conduct.

Electronic Communication
The University provides all KSU students with an "official" email account with the address "students.kennesaw.edu" or "kennesaw.view.usg.edu" (in D2L). As a result of federal laws protecting educational information and other data, this is the sole email account you should use to communicate with your instructor or other University officials.

23. Contacts to get Help:
   - D2L Technical Support or call (470) 578-3555.
   - D2L Brightspace website
   - KSU Help Desk Phone Number: (470) 578-3555.
   - KSU Distance Learning
   - KSU UITS
   - The KSU Writing Center helps students in all majors improve their writing. Experienced, friendly writing assistants help with topic development, revision, research, documentation, grammar, and more. For more information or to make an appointment, visit KSU Writing Center or stop by English Building, Room 242 (Kennesaw campus) or Johnson Library, Room 121 (Marietta campus).
   - Accessibility policy of all technologies.

**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. Changes will be announced in the class and/or in the D2L as it is necessary and appropriate.

<table>
<thead>
<tr>
<th>Class Work:</th>
<th>Total Grade:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Homework</td>
<td></td>
</tr>
<tr>
<td>2. Quiz</td>
<td>10%</td>
</tr>
<tr>
<td>3. Discussions</td>
<td>25%</td>
</tr>
<tr>
<td>4. Midterm Exam</td>
<td>05%</td>
</tr>
<tr>
<td>5. Final Exam</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>30%</td>
</tr>
</tbody>
</table>

**Scale, Letter Grade, and GPA**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>90% - 100%</td>
<td>A</td>
<td>4.0</td>
</tr>
<tr>
<td>80% - 90%</td>
<td>B</td>
<td>3.0</td>
</tr>
<tr>
<td>70% - 80%</td>
<td>C</td>
<td>2.0</td>
</tr>
<tr>
<td>60% - 70%</td>
<td>D</td>
<td>1.0</td>
</tr>
<tr>
<td>&lt; 60%</td>
<td>F</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Withdrawn after deadline:** WF 0.0
<table>
<thead>
<tr>
<th>Class/Week</th>
<th>Tentative Lecture Topic/Outline</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td><strong>Topic 1: Fundamentals of Hazardous Waste (HW)</strong> - HW definition, identification, historical roots, classification, generation, and contaminated sites.</td>
<td>Chapter 1 + Handouts</td>
</tr>
<tr>
<td>Week 2</td>
<td><strong>Topic 2: Legal Framework of HW Management</strong> - Environmental law, Resource Conservation and Recovery Act (RCRA), Federal HW Regulations under RCRA.</td>
<td>Chapter 2 + Handouts</td>
</tr>
<tr>
<td>Week 3 - 4</td>
<td><strong>Topic 3: Toxicology</strong> - Exposure, toxic effects, dose-response relationships, non-carcinogens, carcinogens, &amp; ecotoxicology.</td>
<td>Chapter 5 + Handouts</td>
</tr>
<tr>
<td>Week 5 - 6</td>
<td><strong>Topic 4: Physicochemical Treatment of HW</strong> - Air stripping, carbon adsorption, stream stripping, chemical oxidation, and membrane process.</td>
<td>Chapter 9 + Handouts</td>
</tr>
<tr>
<td>Week 7</td>
<td><strong>Midterm Exam (On-line)</strong></td>
<td>---</td>
</tr>
<tr>
<td>Week 10 - 11</td>
<td><strong>Topic 6: Stabilization and Solidification of HW</strong> - Mechanisms, technology, testing, field implementation, and design.</td>
<td>Chapter 11 + Handouts</td>
</tr>
<tr>
<td>Week 12</td>
<td><strong>Topic 7: Thermal Treatment of HW</strong> - Regulations, combustions, gases &amp; vapors, liquid injection incinerators, solid waste incineration, storage &amp; feed systems, air pollution control, trial burns, etc.</td>
<td>Chapter 12 + Handouts</td>
</tr>
<tr>
<td>Week 13</td>
<td><strong>Spring Break</strong> March 28 – April 3</td>
<td><strong>No Class</strong></td>
</tr>
<tr>
<td>Week 14 - 15</td>
<td><strong>Topic 8: Land Disposal of HW</strong> - Landfill operations, site selection, liner &amp; leachate collections systems, daily, intermediate, and final cover systems, materials, contaminant transport through landfill barriers, landfill stability, and closure &amp; post-closure care.</td>
<td>Chapter 13 + Handouts</td>
</tr>
<tr>
<td>Week 16</td>
<td><strong>Final Exam – Comprehensive (Proctored In-Class; During Final Exam Conflict Periods Tuesday, April 28, 2020, 3:30 p.m. - 5:30 p.m. Room: TBD</strong></td>
<td>---</td>
</tr>
</tbody>
</table>