CE 4323/5375 (001/002)
Geotechnical Aspect of Landfill Design
Summer 2016

Instructor(s): Sonia Samir, Ph.D.

Office Number: 119 Nedderman Hall

Office Telephone Number: (817) 272-6220

Email Address: sonia.samir@uta.edu;

Office Hours: MW (10:00 AM – 12.00 PM)

Section Information: CE 4323-001; CE 4323-002; CE 5375-001; CE 5375-002

Time and Place of Class Meetings: Tue, Th (10:30 am– 12:20 pm)

Course Content:

- Introduction – waste management practices, landfill basics
- Landfill permitting, siting and configuration
- Landfill Operation and Maintenance
  Landfill Working Face

- Engineering properties of Municipal Solid Waste (MSW)
  Basic laboratory testing of MSW

- Design of Landfill
  Landfill bottom liner design
  Drainage and leachate collection
  Gas generation and collection system
  Landfill cover

- Landfill slope stability and settlement
- End use of landfills after closure
- Future of Landfill

Student Learning Outcomes:

- Ability to apply knowledge of mathematics, science, and engineering
- Ability to design and conduct experiments
- Ability to analyze and interpret data
- Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- Ability to identify, formulate, and solve engineering problems
- Understanding of professional and ethical responsibility

- Ability to communicate effectively the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- Recognition of the need for, and an ability to engage in life-long learning
- Knowledge of contemporary issues
- Ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Required Textbooks and Other Course Materials:

Geotechnical Aspects of Landfill Design and Construction - by Xuede Qian, Robert M. Koerner, Donald H. Gray

References:

- Handouts
- EPA Reports (www.epa.gov)
- TCEQ website (www.TCEQ.org)
- Waste Management Reports (www.wm.com)
- Lecture notes, lecture slides, this syllabus, assignments, assignment solutions, term project details, grades, etc. will be available on Blackboard (http://www.elearn.uta.edu).

Descriptions of major assignments and examinations:

There will be 4 (Four) or more homework assignments, one midterm exam and one final exam. All homework assignments must be turned in at the start of the class or, if submitted electronically, prior to the class period in which they are due. **Unprofessionally presented work, or work that is not presented in a way that it can be clearly followed, will be marked as zero.** Full credit will only be given for work presented on time and in a professional manner, unless, due to extenuating circumstances, a request for a time extension is made and permission is granted before an assignment is due.

The development of spreadsheets is encouraged, but sufficient hand solutions must be provided to prove that the developed tool is correct. Typewritten solutions are not required, but if an individual's printing is not clearly legible, it may be necessary.

One week of advanced notice will be provided in scheduling the exams. Group papers/projects presentation time will be decided in the class. The final exam will be given according to the university's published final exams schedule. Note that failure to appear for an exam at the scheduled time will constitute a grade of zero in that exam.

There will be one mid-term test during the semester and one final examination. No make-up exams are given except for medical or other similar hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero in the exam.

Attendance:

Class attendance and punctuality are expected. Anyone missing class for whatever reason is responsible for any class notes, assignments or announcements missed in that class. A make-up examination may be given only if a regular examination is missed for a justifiable reason. Submit a written request within one week after a scheduled examination is missed. Academic dishonesty will be dealt with strict accordance within university regulations.

Grading:

The overall course grade will be based on the performance of each student in the following categories: homework, tests, term project, and lecture participation.

Mid Term Exam	30 %
Final Exam	35 %
Course Project	20 %
Class Participation & Homework	15 %

90 – 100	(A)
80 – 89	(B)
70 – 79	(C)
60 – 69	(D)
00 – 59	(F)

Grade Grievances:

Grade grievances will be handled according to the policy described in the College of Engineering portion of the Catalog.

"X" Grade: Excerpts from UTA Undergraduate Catalog: " A grade of X (incomplete) may be assigned for a course if, in the opinion of the instructor, there are extenuating circumstances which prevent the student from completing the required work within the semester of enrollment for the course. The incomplete must be removed by the end of the final examination period of the following semester, excluding the summer session, for the student to receive credit for the course. If the incomplete is not removed during the allotted time period, it will revert automatically to an F. As long as the grade is carried as an X, it will not be used in the calculation of the student's grade point average. Consistent with these policies, an incomplete grade will only be assigned at the instructor's discretion only under the following circumstances:

- The optional final test is missed with an accepted excuse. In this case, you must make up the final test during the first two weeks of the following semester.
- Due to an extended illness or other extraordinary circumstances, with accepted documentation, the student is unable to participate in class for an extended time. In this case, arrangements must be made to make up the missed work prior to the end of the following semester.

An 'X' grade will not be given as a remedy for poor work.

Drop Policy:

Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Americans with Disabilities Act:

The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that

values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Lab Safety Training: Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed,
Lab Safety Training is valid for the remainder of the same academic year (i.e., through the following August) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272- 6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Writing Center. : The Writing Center, 411 Central Library, offers individual 40 minute sessions to review assignments, *Quick Hits* (5-10 minute quick answers to questions), and workshops on grammar and specific writing projects. Visit https://uta.mywconline.com/ to register and make appointments. For hours, information about the writing workshops we offer, scheduling a classroom visit, and descriptions of the services we offer undergraduates, graduate students, and faculty members, please visit our website at www.uta.edu/owl/.

Librarian to Contact: Barbara Howser, Science and Technology Library.

Tentative Class Schedule

Lecture	Date	Topic
1	6/7/2016	Introduction, Waste Management Practices,
2	6/9/2016	Introduction to Landfill, Landfill Basics, Landfill Siting and Configuration
3	6/14/2016	Example Problem: Landfill Sizing, Compacted Clay Liner
4	6/16/2016	Landfill Operation and Maintenance, Working Face
5	6/21/2016	Engineering Properties of Municipal Solid Waste (MSW)
6	6/23/2016	Laboratory Testing
7	6/28/2016	Landfill Bottom Liner Design
8	6/30/2016	Leachate Generation, Water Balance
9	7/5/2016	Filter Design/ Mid Review
10	**7/7/2016**	**Mid Term**
11	7/12/2016	Drainage Design/Leachate Collection System Design
12	7/14/2016	Leachate Collection System Design
13	7/19/2016	Gas Collection System Design
14	7/21/2016	Gas Collection System Design
15	7/26/2016	Landfill Cover Design/ Alternative Cover
16	7/28/2016	Landfill slope stability/ Settlement
17	8/2/2016	End use of landfills after closure / Future of Landfill
18	8/4/2016	Bioreactor Landfill /Landfill Expansion
19	8/9/2016	Sustainable Resource Management/ Final Review
20	**8/11/2016**	**Final Project Presentation**
21	**8/16/2016**	**Final Examination**