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*Note: Syllabus is subject to change at any point throughout the semester.*
General Course Information

Course Description
Municipal solid and hazardous solid waste management from an environmental engineering perspective, including waste minimization and recycling; engineered volume reduction through composting, incineration, mechanical compaction, and other methods; ultimate disposal, landfill design, and legislative regulations.
Prerequisite: Environmental Engineering 355

Course Objective
This course is aimed to equip students with the knowledge to apply suitable techniques to (1) assess the sources, composition, and properties of municipal solid waste and the transformations that alter the form of the materials constituting the waste; and (2) apply the appropriate engineering principles to evaluate/design the appropriate technology and make operational choices to achieve specific integrated solid waste management objectives.

Participation
Participation requires attending and actively engaging in course topics. No phone or laptop use is permitted during class.

Fall 2014 Schedule
Wednesdays, 7:00 p.m. to 9:40 p.m.; IT-101

Textbook
George Tchobanoglous and Frank Kreith

Instructor Information
Zachary Scott
E 421J
zscott@mail.sdsu.edu
Office hours by appointment; if you are having difficulties with the course material, speak to the instructor as soon as possible. In-person communication is preferred but emails are also acceptable. Skype conferencing is also acceptable.

Background:
Ph.D. Environmental Engineering University of California, Irvine 2010
14 yrs work experience in environmental sciences, private and public sectors
Major Research Interests: Water Quality, Resource Recovery from Wastes
Learning Assessment

As your instructor, I will do my best to help you find value in waste! One man’s waste may be another man’s treasure. You may be taking this course only because it is required, but I hope by the end you have gained new skills, knowledge, and passion to solve some of the problems we face with solids and hazardous waste. I plan to provide you with guidance as we go through the text book, assign you problems and projects that will reinforce solid waste management concepts, offer you insight based on my professional experience, and answer your questions as best as I can. As students, your efforts will determine your rewards, so please allocate the time and effort necessary. Attending class, arriving on time, not introducing distractions in class, actively participating, asking questions, and reading/studying outside of class, doing homework and extra credit projects should help you succeed. I will calculate your grades objectively and the standards for success will be made clear. If you pay attention in class and follow the syllabus, this course is not unreasonably challenging. Just remember, what you put in will dictate what you get out. Over this semester, pay attention, manage your time properly, get your sleep, ask questions, and don’t let your focus on grades overshadow the importance of learning. Imagine that it is your responsibility, or that it is within your grasp to solve environmental problems related to solid and hazardous waste. Getting a high grade is a reasonable goal, but walking away from your university experience with real skills and passion is just as important.

Cheating, including plagiarism, is prohibited. Cases of cheating will result in no credit and will be reported to the university.

- Class Participation (10 points)
  Attendance and active participation are critical for this course. Participation requires arriving on time for class and actively engaging in class, including class exercises. No phone or laptop use is permitted during class. Points will be deducted for phone and laptop use, unsatisfactory attendance, and for not contributing sufficiently to class exercises. Attendance may be recorded at select times.
- Homework (10 points)
  Short assignments will be given regularly to enhance your engineering design skills
- Quizzes (10 points)
  Quizzes will be based on lectures and reading assignments. Except when explicitly instructed otherwise no reference materials are allowed.
- Midterm Exams (25 points each) and Final Exam (30 points)
  Allowable reference materials will be defined previous to each exam. Exams will require knowledge of all material covered from the first class on. A brief review will be presented prior to each exam. Attendance and active participation are critical for this learning assessment.
- Project Bonus (up to 25 points)
  Projects are a chance for you to meet the course objectives that you struggled with on the Midterm exams. You can work with me to select a project that will allow you to increase your knowledge in an area/areas you struggled with on the midterms. Some projects will be selected for presentations near the end of the semester. Projects can be collaborative and point values will reflect the level of effort. Projects are optional but recommended.
### Course Participation

<table>
<thead>
<tr>
<th>Course Participation</th>
<th>Total Points</th>
<th>Points Earned</th>
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<tbody>
<tr>
<td>Class Participation</td>
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<tr>
<td>Homework</td>
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<tr>
<td>Quizzes</td>
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<td>Midterm Exam I</td>
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<td>Midterm Exam II</td>
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<tr>
<td>Project Bonus</td>
<td>(up to 25)</td>
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<td>Final Exam</td>
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### Point Grading

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<td>87-89</td>
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<td>B</td>
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<tr>
<td>B-</td>
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<td>C+</td>
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<td>73-76</td>
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<td>D+</td>
<td>67-69</td>
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<tr>
<td>D</td>
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<td>D-</td>
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Course Outcomes

GENERAL OUTCOMES

- Solve problems in mathematics through differential equations, calculus-based physics, and one additional area of science.
- Drawing from a broad education, determine the global, economic, environmental, and societal impacts of a specific, relatively constrained engineering solution.
- Explain how contemporary issues affect the identification, formulation, and solution of engineering problems.
- Design a complex system or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health & safety, manufacturability, and sustainability.
- Design a Civil, Construction or Environmental experiment to meet a need, conduct the experiment, and analyze resulting data.
- Solve well-defined engineering problems related to Construction or Environmental engineering.
- Function effectively as a member of a multi-disciplinary team.
- Organize and deliver effective verbal, written and graphical communications.
- Apply relevant techniques, skills, and modern engineering tools to solve a simple problem.
- Analyze a complex situation involving multiple conflicting professional and ethical interests to determine an appropriate course of action.
- Demonstrate the ability to learn on their own without the aid of formal instruction.
- Explain key concepts and problem-solving processes used in management.
- Explain key concepts and problem-solving processes used in business, public policy, and public administration.
- Explain the role of a leader, leadership principles and attitudes conducive to the effective practice of Civil, Construction or Environmental engineering.

SPECIFIC OUTCOMES

- Select and apply suitable techniques, technologies, and management programs to achieve specific integrated solid waste management objectives.
- Become aware of principal pieces of legislation that has affected the field of solid waste management to be able to assess the impacts of the legislation on engineering practices and approaches to solid waste management.
- Learn to assess the sources, composition, and properties of municipal solid waste and the transformations that alter the form of the materials constituting the waste; and apply the appropriate engineering principles to evaluate/design the appropriate technology and make operational choices.
- To outline develop strategies for source reduction.
- Be introduced to the processes required to recover recyclable materials from solid waste, to implement materials recovery facilities, and to process recyclable materials to aide in the formulation of a recycling program.
- Be introduced to a variety of scientific, engineering, and economic principles that they will be able to apply to the planning, design, operation, environmental monitoring, closure, post-closure, and remediation of landfills.
- Students will be made aware of the political, technical, economic, and ethical aspects of planning, siting, and permitting new solid waste facilities.
<table>
<thead>
<tr>
<th>Date</th>
<th>Subject</th>
<th>Chapter</th>
<th>Quizzes</th>
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<tbody>
<tr>
<td>27-Aug-14</td>
<td>Introduction-Self Study</td>
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<tr>
<td>3-Sep-14</td>
<td>Brief Intro-Federal and State Regulations</td>
<td>2-3</td>
<td>1</td>
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<tr>
<td>10-Sep-14</td>
<td>Planning Considerations/Waste Characteristics</td>
<td>4-5</td>
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<tr>
<td>17-Sep-14</td>
<td>Source Reduction: Quantity and Toxicity</td>
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<td>3</td>
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<td>24-Sep-14</td>
<td>Collection of Solid Waste</td>
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<td>1-Oct-14</td>
<td>Recycling/Review</td>
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<td>8-Oct-14</td>
<td><strong>Midterm Exam I</strong></td>
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<td>15-Oct-14</td>
<td>Markets and Products for Recycled Material</td>
<td>9</td>
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<td>22-Oct-14</td>
<td>Household Hazardous Wastes and Other Special Wastes</td>
<td>10-11</td>
<td>6</td>
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<td>29-Oct-14</td>
<td>Composting/Review</td>
<td>12</td>
<td>7</td>
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<td>5-Nov-14</td>
<td><strong>Midterm Exam II</strong></td>
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<td>12-Nov-14</td>
<td>Combustion</td>
<td>13</td>
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<td>19-Nov-14</td>
<td>Landfilling-Project Presentations 1</td>
<td>Handout</td>
<td>8</td>
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<td>26-Nov-14</td>
<td>Landfilling (no class meeting)</td>
<td>Handout</td>
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<td>3-Dec-14</td>
<td>Landfilling/Hazardous Waste Landfills- Proj. Pres. #2</td>
<td>Handout</td>
<td>9</td>
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<td>10-Dec-14</td>
<td>Course Summary/Review</td>
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<td>10</td>
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<tr>
<td>17-Dec-14</td>
<td><strong>Final Exam</strong></td>
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</table>
Campus Resources

Campus Library
http://library.sdsu.edu
Need help finding your way in the library or on campus? Not sure how to find that book, or article you need? Want to get a library PIN, but need a hint? The reference librarians are here to help you out! You can reach us in a number of ways. On campus? Stop by the reference desk on the first floor of the Library Addition. If you want some extra attention, make a one-on-one library orientation with a subject specialist in your academic area. Can’t make it into the library? Call the reference desk at (619) 594-6728, or e mail the desk at eref@rohan.sdsu.edu. Just need a quick answer? We even have a text service. Text your questions to (619) 567-9743. Need some help after hours? Don’t forget you have 24/7 access to librarians through instant message chat.

Career Services
http://career.sdsu.edu
Resume/interview preparation and career placement
Student Services East, Room 1200
Open weekdays 8:00 a.m. to 4:30 p.m.

Counseling and Psychological Services
http://www.sa.sdsu.edu/cps
Stress reduction, time management, depression, motivation, suicide prevention, eating disorders, and relationships
Calpulli Center, Room 4401
Open weekdays 8:00 a.m. to 4:30 p.m.

Disabled Students Services
http://go.sdsu.edu/student_affairs/sds
Provides qualified students with disabilities equal access to higher education through academic support services, technology, and advocacy in order to promote their retention and graduation
Calpulli Center, Room 3101
Open weekdays 8:00 a.m. to 4:30 p.m.
Hello Class,

I will be unable to attend the first lecture as I will be in Singapore for the startup of an engineering project for Trojan Technologies, related to solid waste disposal. For the first week there will be no lecture but I have an assignment for you, which will be due at the start of class, at our first lecture scheduled for September 2nd. Due to travel I will be unable to respond to any communications prior to Sept 2nd.

Homework #1

Homework should be typed, printed and presented as written document or organized in a table. I believe in incentivizing good work. The top 10% of HW submitted will be worth double points and the second HW assignment will be optional.

1. Search online and find 3 jobs available related in some way to solid and hazardous waste engineering. For each job:
   - Qualifications required
   - Skills/topics from this course that could help meet the qualifications
   - Missing skills that the course does not provide training for
   - Salary
   - 2 sentence summary of why you like or not like the job

2. Review the course syllabus and:
   - For each week, identify what chapters in the textbook apply to each weekly topic
     - In one to three sentences, describe which topics look interesting to you, and why
     - In one sentence, list which topics you expect will be challenging for you
     - Optional: In one sentence, list which topics you do not think have value, and why.

3. In a short paragraph describe in this order
   - Why you are taking the course
   - What you hope to achieve
   - What you expect will be challenging or easy, based on the syllabus descriptions
   - How many hours you typically invest into a class at SDSU for engineering, breakdown by lecture, study time, homework, projects
   - If you have any special comments or requests for me as your instructor you can conclude with these