Solid waste management must be addressed by virtually every municipality. Issues include landfill capacity, landfill diversion, regulatory compliance, energy recovery, carbon footprints, sustainability, public opinion and economics. This course will cover all aspects of municipal solid waste (MSW) management including refuse generation, source reduction, collection, transportation, recycling and resource recovery, burial in landfills, and treatment by composting, anaerobic digestion and combustion. Regulations and policy relevant to MSW will also be discussed and students are expected to integrate regulatory, policy and technical considerations in the development of engineering designs. The application of life-cycle analysis to waste management systems will also be considered.

The course will emphasize both engineering design and policy alternatives. For example, there are technical, economic, and political considerations surrounding the decision to construct a landfill or a waste-to-energy facility. The advantages and disadvantages of these alternatives will be discussed. Once a decision is made to build a landfill, proper site investigation and design are critical for waste containment. Leachate and gas management must also be considered.

**Course Objective**
To provide the student with a working knowledge of all unit operations involved in solid waste management. At the completion of the course, the student is expected to be familiar with design and policy considerations regarding alternatives for solid waste management.

**Course Format**
The course is going to be flipped. Students are expected to watch the class videos regularly. The class will meet once a week to answer questions, discuss issues in more detail and to discuss homework assignments. Students are expected to come to the discussion prepared with questions. Short quizzes will be given in the first few minutes of selected discussion sessions to motivate students to keep current with the lecture material.
Grading

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<tr>
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<th>477</th>
<th>577</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>20%</td>
<td>18%</td>
</tr>
<tr>
<td>Final</td>
<td>30%</td>
<td>27%</td>
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<tr>
<td>Research Assignments</td>
<td>15%</td>
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<tr>
<td>Class Assignments</td>
<td>50%</td>
<td>40%</td>
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<tr>
<td>Professional Judgment</td>
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The grading scheme may be altered slightly (5 to 10%) during the semester depending on the actual number and difficulty of assignments. Students will be advised of any alterations. Students must have at least a C on the exams to receive a C for the course.

Homework Policy
- Homework assignments are often open ended. You will be required to identify aspects important for design.
- Homework and projects for on campus students must be submitted in groups as described in a separate handout.
- Late homework will not be accepted without a medical excuse. Extensions will not be granted due to a heavy workload. A grade of zero will be assigned for a homework assignment that is not turned in.
- Sloppy homework will be returned for resubmission. Assignments with spelling errors will be returned without review for resubmission with a 10% penalty.

Writing Skills
Selected homework assignments will include a technical writing component. This will give you practice in communicating the results of your work to your superiors, policymakers and the general public. Writing assignments will be graded and resubmission of poorly prepared assignments will be required. A zero will be recorded for commission of errors on the list of common errors (see the Writing Tips document).

Course Expectation
Exams and assignments will be oriented towards evaluating a student's understanding of the subject matter. You are expected to synthesize material as we go through the course. For example, we will discuss regulations concerning recycling as well as the recyclability of various components of the waste stream. Students will be expected to then synthesize this information in the development of technically viable alternatives for compliance with regulations.

Many of you are just a few months and this course away from graduation and professional employment, including a salary! I expect your performance in this course to be similar to your performance in your first job.

Additional Notes
1. Attendance Policy – attendance will not be recorded. Students are responsible for everything presented during class and for checking their ncsu email.
2. Reasonable accommodations will be made for students with verifiable disabilities. To take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. For information on NC State’s policy on working with students with disabilities, please see Academic Accommodations for Students with Disabilities Regulation (REG02.20.1).
   http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.1.php
3. Academic Integrity: Any assignment turned in is assumed to meet NCSU standards for academic integrity which expects the following statement to be true: “I have neither given nor received unauthorized aid on this
test or assignment.” Students will not be expected to sign this statement on individual tests or assignments. By turning in an exam or assignment, it is assumed that you are complying with the academic integrity standard.

Helpful Links

- California Department of Resources Recycling and Recovery: http://www.ciwmb.ca.gov/ (see link to Data Central on the right)