
University of Maryland, Department of Civil & Environmental Engineering
ENCE215 Engineering for Sustainability – Spring 2015

Instructor: Natasha Andrade, Ph.D.
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Office: 0160 Glenn L. Martin Hall
Office Hours: Tu/Th: 11:00 pm – 12:00 pm

Sections:
Section 0101 – Tu/Th: 9:30 am – 10:45 am – EGR3111
Section 0201 – Tu/Th: 2:00 pm – 3:15 pm – EGR 3102
Section 0301 – Tu/Th: 3:30 pm – 4:45 pm – EGR 2154

Course Description

This course provides a review of physical, chemical, and ecological principles used to examine interactions between humans and the environment, as they relate to the field of civil engineering. The fundamental concepts are taught using analytical and computational methods, which are necessary for designing and analyzing the sustainability of various engineering processes and technologies. The course also provides background needed to think critically about environmental sustainability and its relation to: energy, material choice, infrastructure design, water and atmospheric resources, human population growth, and resource consumption.

Prerequisites: CHEM135 Chemistry for Engineers and permission of department.

Course Goals

- Act as an academic bridge to progress from fundamental math and science courses to upper level engineering and design courses.
- Apply knowledge of basic science principles related to chemistry and physics to engineering problems related to sustainability.
- Develop the ability to identify and solve engineering problems related to civil and environmental sustainability.
- Increase student understanding of the interdisciplinary nature of sustainable development. Provide information that is essential to for engineering decision making related to societal issues and civil and environmental engineering (e.g. energy and water resources, environmental quality).

Reading Material

No required textbook. If a reading assignment is required, you will be notified in class. Any reading assignments will be posted to the course website on Canvas. It is recommended that you have access to any General Chemistry textbook (e.g. ***Chemistry for Environmental Engineering*** by Sawyer, McCarty & Parkin. McGraw-Hill Book Co. ISBN:0-07-123045-9). If you do not own a copy, many are available for check-out in the UMD Chemistry & EPSL libraries. Access to the following on-line Biology reference may be useful: <http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookTOC.html>

Attendance

Regular attendance and participation in this class is the best way to grasp the concepts and principles being discussed. However, in the event that a class must be missed due to an illness, the policy in this class is as follows: If a student is absent on days when tests are scheduled or projects are due, he or she is required to notify the instructor in advance, and upon returning to class, bring documentation of the illness, signed by a health care professional.

Grading

Quizzes (6 @ 15 pts each) – minus 1 lowest grade	15%
Project (1 @ 100 pts)	20%
Midterm Exams (2 @ 100 pts each)	40%
Final Exam (125 pts)	25%
Total (500 pts total)	100%

0	F
6.0	D-
6.33	D
6.67	D+
7.0	C-
7.33	C
7.67	C+
8.0	B-
8.33	B
8.67	B+
9.0	A-
9.33	A
9.67	A+

Final Grade = (Q + P + M1 + M2 + F)/50

- Q = Quiz Grade = Σ Quiz Points Received - lowest quiz grade
- P = Project Grade
- M1 = Midterm 1 Grade
- M2 = Midterm 2 Grade
- F = Final Exam Grade

Quizzes

A few short (i.e. 10-15 min) quizzes will be given to test concepts covered during previous class sessions. Quizzes may be announced or unannounced and can be in-class or outside of class, online, or take-home. **No exceptions** will be made for students arriving late or not attending class. The lowest quiz grade will be dropped from the total.

Project

The project will be worth 100 points (20% of total grade). It will include a paper and a group presentation. More information on the project will be covered in another document posted on Canvas.

Exams

Two mid-term exams (75 min each) will be given during normally scheduled class periods. Exams will be closed-book with emphasis on material covered since the previous exam. A mixture of quantitative and qualitative analysis and reasoning will be expected. The final exam (120 min) will be cumulative, closed-book/notes.

Tentative Course Schedule

Date	Event
01-Sep	Lecture 1: Syllabus Overview and Visioning Exercise
03-Sep	Lecture 2: Population and Growth
08-Sep	Lecture 3: Resources – Carbon Cycle
10-Sep	Lecture 4: Energy Conversion and Transfer – Fossil Fuels
15-Sep	Lecture 5: Biomass and Waste-to-Energy
17-Sep	Lecture 6: Solar Energy
22-Sep	Lecture 7: Wind Energy
24-Sep	Lecture 8: Hydro Energy
29-Sep	Lecture 9: Geothermal Energy
01-Oct	Lecture 10: Nuclear Energy
06-Oct	Exam 1
08-Oct	Lecture 11: Fuel Cells
13-Oct	Lecture 12: Energy Storage, Conservation, and Efficiency
15-Oct	Lecture 13: Water-Energy Nexus
20-Oct	Game Project (Paper due on 05-Nov)
22-Oct	Guest Lecturer – Mark Stewart
27-Oct	Lecture 14: Stormwater Management
29-Oct	Lecture 15: Stormwater Calculations
03-Nov	Lecture 16: Stormwater Calculations
05-Nov	Lecture 17: Life Cycle Assessment and Cradle-to-Cradle Design
10-Nov	Exam 2
12-Nov	Lecture 18: Sustainability in Remediation
17-Nov	Lecture 19: Rating Systems – LEED, Envision, and Invest
19-Nov	Lecture 20: Urbanization
24-Nov	Guest Lecture – Urbanization
26-Nov	Thanksgiving
01-Dec	Guest Lecture – Sandra Knight
03-Dec	Project Presentations
08-Dec	Project Presentations
10-Dec	Review – Revisit of Visioning Exercise
15-Dec	Final (section 0101) – 8:00-10:00am
17-Dec	Final (section 0201) – 10:30-12:30pm
19-Dec	Final (section 0301) – 10:30-12:30pm

Academic Integrity

"The University is one of a small number of universities with a student-administered Honor Code and an Honor Pledge, available on the web at <http://www.jpo.umd.edu/aca/honorpledge.htm>. The Code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. Compliance with the Code is administered by a Student Honor Council, which strives to promote a "community of trust" on the College Park campus. Allegations of academic dishonesty can be reported directly to the Honor Council (314-9154) by any member of the campus community. For additional information, see the Office of Judicial Programs and Student Ethical Development website (<http://www.jpo.umd.edu/>)."

The University of Maryland Honor Pledge reads: "I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination."

Unless you are specifically advised to the contrary, the Pledge statement should be handwritten and signed on the front cover of all papers, projects, or other academic assignments submitted for evaluation in this course. Students who fail to write and sign the Pledge will be asked to confer with the instructor.

Accommodations for Students with Disabilities

The University is required to provide appropriate accommodations for students with disabilities. Students with disabilities should inform me of their needs at the beginning of the semester so that I can contact the appropriate individuals who will work to determine and implement appropriate academic accommodations.

Policy on Religious Holidays

The University System of Maryland policy on religious observances provides that "students should not be penalized because of observances of their religious beliefs; students shall be given an opportunity, whenever feasible, to make within a reasonable time any academic assignment that is missed due to individual participation in religious observances." However, "it is the student's responsibility to inform the instructor of any intended absences for religious observances in advance. Notice should be provided as soon as possible but no later than the end of the schedule adjustment period." Prior notification is especially important with respect to the final exam and other exams.