CE 370 (Section 1)
Introduction to Environmental Engineering

Course Description:
Three-credit course intended to provide students with an exposure to and fluency in the nature and scope of environmental issues, including air, water, and land impacts; an understanding of the fundamentals and processes of pollution control; and the ability to apply engineering principles in the analysis and solution of environmental problems. Prerequisites: CHEM 012; MATH 111 or MATH 141.

CEE Program Outcomes Mapped to this Course:
(1) An ability to apply knowledge of mathematics, science, and engineering
(5) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Instructor:
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Office hours: Mon 10-11 am, Thurs 2-3 pm, or by appointment

Meeting Times:
TR 8:00-9:15 am, 127 Sackett Building

Text:
Davis, M.L. and D.A. Cornwell (2008). Introduction to Environmental Engineering, 4th Edition. McGraw-Hill, New York, NY.

Exam Policy:
Semester exam dates are noted in the schedule and will be administered during the class period. They will emphasize the material from the preceding course section but assume competency in all covered material. The final exam will also emphasize the material from the preceding section and will be administered during finals week (date and time TBA). Exams are closed book, closed notes.

Homework Assignments:
There will be six homeworks, due **in class** on the dates noted on each assignment. Grades for late homework submissions will be reduced 20% per fractional day. Essay responses must be typed, and hand-written solutions must be legible. Discussion of homeworks with classmates is encouraged, but individual submittals are required.

Quizzes
There will be five in-class quizzes throughout the semester, roughly staggered with the homework assignments.

Grading Policy:

The final grade will be calculated as follows:

Homework (6)	30% total
Quizzes (5)	10% total
Exams (3)	20% each

The grading schedule is shown below:

A	93-100%	C+	77-80%
A-	90-93%	C	70-77%
B+	87-90%	D	60-70%
B	83-87%	F	< 60%
B-	80-83%		

Academic Integrity: The University's statement on academic integrity, from which the following statement is drawn, is available at http://www.psu.edu/dept/oue/aappm/G-9.html.

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

All students are expected to act with civility, personal integrity; respect other students' dignity, rights and property; and help create and maintain an environment in which all can succeed through the fruits of their own efforts. An environment of academic integrity is requisite to respect for self and others and a civil community.

Academic integrity includes a commitment to not engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty include cheating or copying, plagiarizing, submitting another persons' work as one's own, using Internet sources without citation, fabricating field data or citations, "ghosting" (taking or having another student take an exam), stealing examinations, tampering with the academic work of another student, facilitating other students' acts of academic dishonesty, etc.

Students charged with a breach of academic integrity will receive due process and, if the charge is found valid, academic sanctions may range, depending on the severity of the offense, from F for the assignment to F for the course.

Syllabus:

Dates	Topics	Reading
1/16	Introduction, Environmental Ethics, Environmental Impact Statements	Ch. 1:1-3, 5
1/18	Units, Mass Balances, Rate Expressions	Ch. 2: 1-3
1/23	Rate Expressions (cont.), Energy Balances	Ch. 2: 4
1/25	Environmental Chemistry: Stoichiometry, Oxidation-Reduction	Handout
1/30	Environmental Chemistry: Equilibria, Partitioning, Precipitation/Dissolution	Handout
2/1	Environmental Chemistry: Acid-Base Reactions, Alkalinity	Handout
2/6	Environmental Microbiology: Basic Principles, Growth, BOD	Handout
2/8	Water Quality - Effects of BOD on receiving waters	Ch. 5: 1-4
2/13	Wastewater Treatment (WWT): Regulations, Pollutants	Ch. 6:1-3
2/15	WWT: Primary Treatment, Secondary Treatment	Ch. 6: 5-9
2/20	WWT: Nutrient Removal, Residuals Management	Ch. 6: 10, 12-13
2/22	**Exam 1**	
2/27	WWT: Alternatives – H_2 Production, Microbial Fuel Cells, Hydroponics	Handout
3/1	Water Treatment (WT): Regulations, Pollutants, Coagulation, Flocculation, Sedimentation	Ch. 4: 1-2, 4-5
3/6	WT: Filtration, Disinfection, Softening, Advanced Techniques	Ch. 4: 3, 6-7
3/8	WT: Advanced Treatment Techniques	Ch. 4: 8-9
3/13, 3/15	**Spring Break**	
3/20	Air Pollution: Regulations, Pollutants, Carbon Cycle, Greenhouse Effect	Ch. 7: 1-5
3/22	Air Pollution: Transport, Sources, Treatment	Ch. 7: 8, 10-11
3/27	Renewable Energy Production	Handout
3/29	Solid Waste: Regulations, Recycling/Source Reduction	Ch. 9: 1, 6
4/3	Solid Waste: Landfills/Bioreactors, Composting, Waste-to-energy Incineration	Ch. 9: 4-5
4/5	**Exam 2**	
4/10	Hazardous Waste: Regulations, Risk	Ch. 10: 1-5
4/12	Hazardous Waste: Management, Treatment	Ch. 10: 6-7
4/17	Hazardous Waste: Groundwater Flow and Contaminant Transport	Ch. 10: 9
4/19	Hazardous Waste: Remediation	Ch. 10: 7-9
4/24	LEED Rating System: Site Sustainability, Water Efficiency, Green Construction	Handout
4/26	LEED Rating System: Materials and Resources, Indoor Environmental Quality	Handout
5/1	Life-Cycle Assessment, Green Design	Handout
5/3	Open period for catch up and review	
5/7-5/11	**Finals Week**	