ChEE 370R
Environmental and Water Engineering
Spring 20XX
University of Arizona

Instructors: Dr. Andrea Achilli
306E Civil Engineering
Office Hours: by appointment

Lecture: Days / Time / Location TBD

Course Description:
Covers principles and methods for analysis of environmental engineering issues. Includes such topics as greenhouse gas effects, tropospheric air pollution, environmental air pollution, environmental risk assessment, surface and ground water pollution and drinking and wastewater treatment.

Communicating with the Professors Online:
This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email team@piazza.com.

Find our class page at: https://piazza.com/arizona/spring2020/chee370r/home (example only)

Course Objectives:
Upon completion of this course, students should be able to:
1) to be able to switch between units of interest in different environmental contexts while solving mass and energy balances that are related
2) to be able to use transient mass balances to calculate limits on population regarding critical resource constraints
3) to be able to understand how different compounds and organisms interact to cause toxicity and to be able to calculate dose response parameters important to maintaining life

Expected Learning Outcomes:
• Students will acquire and apply new knowledge on the impacts of engineered systems on the environment and the applications of engineering technology to protecting environmental quality and human health
• Students will acquire the ability to apply scientific principles to the formulation of problems in environmental systems
• Students will acquire the ability to synthesize and develop solutions to complex environmental problems in the areas of air, soil, and water pollution

Absence and Class Participation Policies:
Class and supplemental attendance are not optional for this class. Unlike some classes where students passively copy notes, the activities done in class are critical to student success. Class attendance will be verified with a clicker question that appears at some point randomly in the day's activities and will be auto-recorded through that device. If you do not have a clicker, please get one as quickly as possible from the UA Bookstore or purchase a license for TurningPoint ResponseWare. Clickers will also be used to gauge understanding of reading material, support class discussions, facilitate understanding of

new concepts and review previously taught material.

If you forget your clicker, please take a picture of your notes from that day, email the picture to chee2019attendance@gmail.com, and report the class and date in the subject so you can receive attendance points. If you miss class, you can watch the recording in Panopto in UA Tools on D2L and then email the same email address to earn 75% of the attendance points.

Absences for any sincerely held religious belief, observance or practice will be accommodated were reasonable: http://policy.arizona.edu/human-resources/religious-accommodation-policy

Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

Required Text Readings:

Introduction to Environmental Engineering and Science, 3rd Edition, Masters and Ela, Pearson-Prentice Hall, 2008.

Required or Special Materials:
We will be using Turning Technologies Clickers and/or responseware for class extensively for both attendance and for helping the teaching team see where students need more help in mastering the content of the course. A link here helps remind students of details on how to get registered and set up: https://oia.arizona.edu/content/19

Required Examinations and Assignments:
There will be two midterm exams, approximately 10 homework assignments, and one final exam. Each midterm exam will be split into an individual conceptual and individual calculational portion. Detailed dates are provided in a schedule later.

Required Extracurricular Activities:
None

Grading Scale and Grade Policies:
This section will highlight the breakdown of major graded elements first, then detail the grading scale, and then get into details.

Course Website: D2L website for ChEE 370R

Important Dates to Keep in Mind:
The Registrar's website has a list of all important dates and you can find them here: https://www.registrar.arizona.edu/courses/dates-deadlines

Grading Scale and Grade Policies:
This section will highlight the breakdown of major graded elements first, then detail the grading scale, and then get into details.

The following are the major components of the total grade in this class:

Component	Percentage
Pre-class Quizzes	12.5 %

Attendance and Participation	5 %
Homework	12.5 %
Midterm Exams	60% total (22.5+22.5+15% each)
Final Exam	10 %

Research has shown consistently that students who do preparatory work prior to a class meeting, such as learning definitions, attempting a problem, or organizing information, do substantially better than students who do not. This does not imply more work, but shifting work to being more pro-active instead of working harder after the fact to get caught up with the new content. Reading assignments to complete before class will be given, followed by a pre-lecture quiz in D2L. Students can take each quiz three times, and these quizzes cumulatively contribute 12.5% to the total class grade.

Class and Attendance and Participation (5 % of grade)
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Homework Assignments (12.5 % of grade)
Homework is due to the appropriate assignment submission folder on D2L by the start of class on the day it is due. Students should save their HW as LastName-FirstName-HW# as graders may download files and keeping track of who submitted what may be difficult without clear filenames. Late homework will be accepted until 11:59 pm on the due date with 10% penalty. Some homework will be done in groups and should be submitted to the group assignment submission folder for each assignment on the day it is due. All assignments must be submitted electronically. Paper copies will not be accepted. The submitter is responsible for reporting if any group member did not participate in a meaningful way to creating the group solution. Students who do not participate will not receive full credit. For instance, a group could report that a member helped on ¼ of the problems and didn't show up to meetings or comment by email, and that student would then receive only ¼ of the group grade.

Exams (2 exams, 45 % of grade).
These in-class exams are **comprehensive,** and the scheduled dates can be found at the end of this document. These exams will require students to make a concept map of the major and minor topics of the class for up to five points of credit toward the exam. These exams will also be closed book and one crib sheet, front and back. Make-up exams will not be given.

Final exam: (25% of grade)
Final exam policies are described here:
https://registrar.arizona.edu/courses/final-examination-schedule-spring-2020?audience=students&cat1=10&cat2=31 and will be followed in this class.

The final exam is scheduled for (Day / Time / Location TBD)
https://www.registrar.arizona.edu/students/courses/final-exams

Grading Rubric:
Letter grades on exams or assignments will not be determined; a final letter grade will be given at the end of the semester instead. This course will be graded on a straight scale as follows:

Total percentage of points earned	Final Grade
90-100 %	A
80 – 89.99999 %	B
70 – 79.99999 %	C
60 – 69.99999 %	D
< 60 %	E

Classroom Behavior Policy
Developing your ability to effectively work in teams is an important aspect of this course, so you will regularly work in small groups in class, and you will complete weekly group homework and take group exams. You will be expected to look up information on the e-text or on websites. The teaching team will help remind you not to text or be using your devices for other reasons. You will be expected to respectfully work with all teammates and to be supportive of each other when you struggle with the content.

Threatening Behavior Policy
The general policies against threatening behavior by students will be followed:
http://policy.web.arizona.edu/education-and-student-affairs/threatening-behavior-students

Academic Integrity Policy
Plagiarism in any form, including copying the work of another student, will not be accepted. The plagiarism policies within the Student Code of Academic Integrity will be strictly followed: https://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity. Clicking in for another person is a form of academic dishonesty and will be dealt with according to the same guidelines.

Nondiscriminatory and Anti-harassment Policy
UA policies list prohibited behaviors here:
http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Accommodations for Students with Disabilities
Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit http://drc.arizona.edu.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Schedule of Topics and Activities
The schedule appears at the end of this document in concise form.

Standards for Homework Problems and Exams:
1. Briefly restate the problem using a sketch or diagram where appropriate. Label the sketch or diagram with all quantities involved.
2. Indicate the basis you select, and indicate any change of basis within the problem. State assumptions.
3. Include both the numerical value and units for all quantities involved, including intermediate results.
4. Answers should be circled or otherwise marked and reported to an appropriate number of significant digits.
5. Values obtained from a handbook or other reference should be accompanied by a citation. For example:

CCl_4 boiling pt. 76.5 °C (CRC, pg C-373)

6. Show how you have checked your work if appropriate.
7. Be clear and concise when writing answers to questions.

Substandard work will result in a loss of credit.

Course Prerequisites:
CHEE 201 and (CHEM 241A or CHEM 242A or CHEM 246A) and (CHEM 243A or CHEM 247A) or Engineering Advanced Standing.

Changes to the Syllabus: The information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advanced notice as deemed appropriate by the instructors.

Class Schedule: (note: schedule is subject to change and section numbers may not match your edition of the book, but topics will)

Week	Lec. No.	Date	Day	Pre Lecture Recording (TBA)	Reading Assigned for this Day from Masten and Ela	Pre Lecture Quiz	Due Dates	Topic
1	1	xxx	x	N/A	N/A	N/A		Class intro, structure & purpose
2	2	xxx	x		Pg. 1-21	2		Mass balances review
	3	xxx	x			3		Transient mass balances review
3	4	xxx	x		Pg. 87-120	4		Growth/resource demand (3 hrs)
	5	xxx	x			5	HW 1	
4	6	xxx	x		Pg. 47-52, 57-70	6		Water chemistry (3 hrs)
	7	xxx	x					
5	8	xxx	x		Ch 14 Davis and Masten	8	HW2	Hazardous waste (4.5 hours)
	9	xxx	x		Pg. 333-357	9		
6		xxx	x				Test 1	
	10	xxx	x			10		
7	11	xxx	x					
	12	xxx	x			12		
8	13	xxx	x		Pg. 367-399	13	HW 3	Air pollution (4.5 hrs)
	14	xxx	x		Pg. 438-486	14		
		xxx	x	Spring break				
		xxx	x	Spring break				
9		xxx	x					**NO CLASS**
	15	xxx	x			15		
10	16	xxx	x		Pg. 502-536	16		Global warming (4.5 hrs)
	17	xxx	x		Pg. 537-587	17	**HW 4**	
11		xxx	x				**Test 2**	
	18	xxx	x		Pg. 173-229	19		Water resources/pollution (4.5 hrs)
12	19	xxx	x			20	HW5	
	20	xxx	x					
13	21	xxx	x		Pg. 231-265	21&22		Groundwater hydrology (3 hrs)
	22	xxx	x			23	HW6	
14	23	xxx	x		Pg. 127-134, Pg. 146-166	24		Risk assessment (1.5 hrs)
	24	xxx	x		Pg. 281-335	25	HW7	Water/wastewater treatment (4.5 hrs)
15	25	xxx	x			25		

	26	xxx	x			26	HW 8	
16	27	xxx	x			27	**Test 3**	
		xxx	**x**	**Final Exam (time TBD)**				