

ChEE 370R
Environmental and Water Engineering
Spring 2018
University of Arizona

Instructors: Dr. Paul Blowers Office Hours: TBD
128 Harshbarger

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306E Civil Engineering

Lecture: TR 9:30 – 10:45 Harvill 404
Supplemental Session for Civil Engineering Students: F 12-12:50 Educ 318

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.

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

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/spring2018/chee370r/home>

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
- 4)

Course Prerequisites:

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

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>

Course Grading Policies:

Pre-Class Quizzes (12.5 % of grade)

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)

Class and supplemental attendance (ChEE 370L for non-chemical engineering students) 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. Clickers will also be used to gauge understanding of reading material, support class discussions, facilitate understanding of new concepts and review previously taught material.

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 not be accepted. 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 (3 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 open book, with students allowed to write anything they want in the blank spaces in their Felder and Rousseau books. We tried an experiment in ChEE 201 during the fall semester of allowing students to listen to music on headphones during the exam to block out distracting noises and to stay relaxed. We will allow this again this semester. Make-up exams will not be given.

Final exam: (25 % of grade).

Comprehensive final on Tuesday 5-8-18 at 8 am.

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:

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

Other Course Policies: Mobile devices used for personal use rather than assigned class activities are strongly discouraged. Students who disrupt class or learning activities will be asked to leave the classroom.

Plagiarism and Academic Dishonesty: 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.

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

Accessibility and Accommodations:

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.

Please be aware that the accessible table and chairs in the regular lecture and supplemental classrooms should remain available for students who find that standard classroom seating is not usable.

SALT Center and Disability Resource Center: Students who are able to use the services of the Strategic Alternative Learning Techniques Center or may have other educational needs may see the professors at any time to discuss accommodations for their needs. However, this should be done at least one week prior to the first exam to allow for preparations that may be needed.

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:

CCl₄ 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.

Required Extracurricular Activities: none

Special Materials Required for the Class: See online 2 content.

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: section numbers may not match your edition of the book, but topics will)

Week	Lec. No.	Date	Day	Pre Lecture Recording	Reading Assigned for this Day from Masten and Ela	Pre Lecture Quiz	Due Dates	Topic
1	1	1-11	R	N/A	N/A	N/A		Class introduction, class structure and purpose
2	2	1-16	T		Pg. 1-21	2		Mass balances review
	3	1-18	R			3		Transient mass balances review
3	4	1-23	T		Pg. 87-120		HW 1	Growth/resource demand (3 hrs)
	5	1-25	R					
4	6	1-30	T		Pg. 47-52, 57-70		HW2	Water chemistry (3 hrs)
	7	2-1	R		Pg.			
5	8	2-6	T		Ch 14 Davis and Marsten		HW 3	Hazardous waste (4.5 hours)
	9	2-8	R		Pg. 333-357			
6	10	2-13	T				Test 1	
	11	2-15	R					Air pollution (4.5 hrs)
	12	2-20	T					
7	13	2-22	R					
	14	2-27	T		Pg. 367-400			Global warming (4.5 hrs)
	15	3-1	R		Pg. 438-486			
		3-6	T	Spring break				
		3-8	R		Pg. 173-229			Water resources and pollution (4.5 hrs)
9	16	3-13	T					
	17	3-15	R					
10	18	3-20	T					
	19	3-22	R				Test 2	
11	20	3-27	T		Pg. 231-265			Groundwater hydrology (4.5 hrs)
	21	3-29	R					
12	22	4-3	T					
	23	4-5	R					
13	24	4-10	T		Pg. 57-70			
	25	4-12	R					
14	26	4-17	T					

	27	4-19	R		Pg. 127-134			Risk assessment (3 hrs)
15	28	4-24	T		Pg. 146-166			
	29	4-26	R				Test 3	
16	30	5-1	T		Pg. 281-335			Water/wastewater treatment (6 hrs)
	31	5-3	R		Review			