

Instructor: Dr. Pinar Omur-Ozbek

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Office hours: M-W-F 10-11 am, or e-mail for appointment

Teaching Assistant: Ms. Emily Cook, e-mail: emcook2@mail.colostate.edu

Course Description: This course covers chemical concepts related to Environmental Engineering problems. It will be based on design projects to grasp and become proficient in those concepts.

Prerequisites: CHEM 113 and MATH 340.

Course Objectives: Upon completion of this course students will be able to:

- perform materials balance, chemical reactions and kinetics analysis to solve environmental pollution problems,
- work in a team environment to apply chemical concepts in environmental engineering through a group project that incorporates ethics, sustainability and design calculations,
- synthesize the basic processes of design for environmental engineers through current topics,
- obtain a better score at the Environmental and Engineering sections of the FE and PE Exams.

Textbook (highly recommended): Davis, M.L. and Cornwell, D.A. 2012. Introduction to Environmental Engineering, 5th Edition, McGraw-Hill. ISBN: 978-0-07-340114-0.

Supplemental books:

- Davis. Water and Wastewater Engineering, McGraw-Hill, 2007, ISBN-10: 0-07-339786-5
- AWWA, Water Quality and Treatment, Fifth Edition, McGraw-Hill, 2010, ISBN 0-07-001540-6.
- Stumm and Morgan. Aquatic Chemistry, Third Edition, John Wiley & Sons, Inc., New York, 1996, ISBN 0-471-83941-8.

Grading:

- Homework - 20 %
- Midterm exam - 20 %
- Group project (reports and presentations) – 30 %
- Final report and presentation - 20 %
- *Class participation/Behavior* - 10 %

Grading scale: Grades will be determined by the +/- grading system as described in the CSU catalog. The scale to be used: A⁺ ≥ 97; A ≥ 94; A⁻ ≥ 90; B⁺ ≥ 87; B ≥ 84; B⁻ ≥ 80; C⁺ ≥ 75; C ≥ 70; D ≥ 60; F < 60.

Homework: Homework will be assigned on a weekly basis. Due dates and total points will be indicated individually for each assignment and the homework will be collected **at the beginning of the laboratory session**. Later submissions will not receive any credit. Although collaboration is allowed and encouraged, final submitted copy should be prepared by **individual effort** unless otherwise stated in the HW description.

Midterm Exam: There will be one **take home** exam handed out on (Monday) **October 10th** from the topics covered until the day of the exam. Students are **allowed to work in groups of up to 3**, however, **every student will submit their own solution**, and **discussion between groups is not allowed**. Students are required to clearly show all the work, discussion and calculation steps otherwise no credit will be given for just a brief answer. Students should provide the team members' names whom they worked with on the cover of the midterm.

In accordance with CSU policies, I would like you to include and sign the following statement on all written work: "I pledge on my honor that I have not given, received or used any unauthorized assistance _____ (signature)."

Group Project: The class will include a major group design project. During the first two weeks of the semester students will form design teams of ~4 students based on their interest in the available projects. The lectures and laboratory sessions will support the topics necessary to work on the design projects. The groups will be expected to give short weekly updates on their projects during laboratory sessions. The teams will work towards their final report throughout the semester. The details for the contents of the reports and timeline are presented below. The reports are presentations will include:

1. Overview/Background on the project which should include a summary of the objectives and constraints. (What is the problem to be solved? What are the challenges? What information do you need?) (1 single-spaced page, 12 Times font, 1 inch margins)
2. Literature Review (Have similar projects been completed? What were the approaches? What have you incorporated into your project?) (4 single-spaced pages, 12 Times font, 1 inch margins)
3. Environmental ethics and sustainability discussion of the project (What are the ethical concerns related to your design? What measures did you take to make it a sustainable solution?) (1 single-spaced page, 12 Times font, 1 inch margins)
4. Discussion of significant decisions and design options that were made on the project design and implementation (4 single-spaced pages, 12 Times font, 1 inch margins)
5. Cost-Benefit Analysis of the design options (2 single-spaced pages, 12 Times font, 1 inch margins)
6. Design Documentation (All the details of your design) (6 single-spaced pages, 12 Times font, 1 inch margins) (you can reference items in an appendix to save on space)

The expected activities related to the group project are as below (to get the full 50%):

- Weekly informal update presentations throughout the semester (10%)
- Report 1 that covers overview and literature review, due on September 28th (5%)
- Presentation 1 that covers overview and literature review, on September 28th (5%)
- Report 2 that covers ethics/sustainability & design options/decisions, due on November 2nd (5%)
- Presentation 2 that covers ethics/sustainability & design options/decisions, on November 2nd (5%)
- Final report that covers all (**updated** sections 1-4) due on November 30th (10%)
- Final presentation during last week of classes (10%)

A bonus/voluntary reflection assignment, that summarizes what you have learned about environmental engineering design and the group design process, is due on the last day of class (12/7) that will add 2 % to your grade.

Class participation/Behavior: To be able to get the full 10% students are required to **attend at least one office hour** until **September 9th** and participate in class and laboratory discussions throughout the semester. Students should stop by the instructor's office until the deadline. Schedule an appointment if you have a conflict with the office hours.

Please also note:

- Students are highly encouraged to utilize the office hours to discuss any issues and difficulties related to the course material.
- Students have **one week** to discuss their quiz/exam/homework after they are returned.
- If a student has a conflict with an exam, the instructor should be notified at least **two weeks** prior to the exam date. Make-ups won't be given for missed exams without a prior **notice and an official document**, or with an **official document** for **acceptable emergencies**.
- Grades will be posted regularly in Canvas so that students may keep up to date with their standing in the course. Course materials and announcement will also be uploaded to Canvas.
- E-mails regarding the course should contain CIVE 439 in the subject line, and a proper salutation in the main text of the e-mail.

Honor Code: As developed and endorsed by the 38th Senate of the Associated Students of Colorado State University on Sept 10th 2008, the honor code will be adopted by this course and the students are required to acknowledge and practice the honor code as stated below:

“As a student at Colorado State University, I recognize my active role in building a Campus of Character. This includes my commitment to honesty, integrity, and responsibility within the campus community. As such, I will refrain from acts of academic dishonesty. Furthermore, reflecting upon this commitment, I find it my prerogative to conduct myself in a dignified and inclusive manner, taking the initiative to do justice within my institution, be considerate to my peers, and persevere both academically and personally.”

Also CSU standards regarding academic integrity may be found in the General Catalog, online at <http://www.catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf> (page 7).

Students with Disabilities: If you are a student who will need accommodations in this class, please make an appointment to see me to discuss your individual needs. Any accommodation must be discussed in a timely manner prior to implementation. A verifying memo from Resources for Disabled Students may be required before any accommodation is provided.

Class Schedule

Week#	Date	Topic	Remarks
1	08/22	Introduction / Environmental Issues	Get to know each other
2	08/29	Environmental Rules and Regulations	Design teams formed
3	09/05	Materials Balances	
4	09/12	Reactor Design	
5	09/19	Chemical Equilibrium and Kinetics	
6	09/26	Unit Process Principles	Report 1 & Presentation 1
7	10/03	Unit Process Principles	
8	10/10	Sustainable Design	Midterm Exam
9	10/12	Multi Criteria Decision Analysis	
10	10/24	Cost Estimation Methods	Treatment Design
11	10/31	Cost Benefit Analysis	Report 2 & Presentation 2
12	11/07	Emerging Contaminants	Treatment Design
13	11/14	Contemporary Design	Treatment Design
14	11/21	Fall Break	Have Fun!
15	11/28	Industry Guest Lectures	Final Report
16	12/05	Final Design Presentations	End of semester

* Please note that the class schedule is subject to change.