CEE 4330: AIR POLLUTION ENGINEERING
COURSE SYLLABUS

Instructor: Jennifer Kaiser | jennifer.kaiser@ce.gatech.edu | ES&T 3224

Lecture: Mon/Wed 2:00 pm - 3:15 pm, Mason 2117.

Lectures are in-person. Notes will be posted on Canvas. Audio recordings may be made available.

Office Hours: Mon 3:15 pm - 4:30 pm, or by appointment (just email me and ask!)

Description: Introduction to the physical and chemical processes affecting the air pollution at local, regional, and global scales. Particular emphasis is on tropospheric pollutant chemistry and transport.

Educational Objectives: The course is designed to introduce students to fundamental principles needed to address air pollution. Upon course completion, the student will have knowledge of the air pollutants of most concern, their source and control, their atmospheric transport and fate, and air pollution management policies.

Materials: All needed information will be presented in class. Two textbooks can be used for reference:

- *Air Pollution Control: A Design Approach 4th Edition;* C. David Cooper and F. C. Alley
- *Introduction to Atmospheric Chemistry*; D. J. Jacob, available for free online

Grading: Grades are composed of four components, weighted according to the distribution below. Final grades are rounded to the nearest whole number. There is no curve. Grades are assigned as stated below.

- Problem Sets (4) 40%
- Unit Conversion Quiz 5%
- Micro-lecture Assignment 10%
- Exams (2, or 2 + final) 45%

A: ≥85% **B**: 75-84% **C:** 65-74% **D:** 50-64%

Problem Sets: Due at the beginning of class. Hard copies are preferred. Electronic versions are accepted, but will not receive the level of feedback you would get from a hard copy. If you are submitting electronically, upload your entire assignment as a SINGLE PDF ONLY (not multiple files). Any submissions with multiple files or corrupted files will be treated as an incomplete or late assignment. An assignment must be submitted either as a PDF or in-person, not some combination of the two.

Unit Conversion Quiz: This is a fundamental skill needed to succeed in this class. It will be explicitly tested very early in the semester.

Micro-lecture Assignment: Students will generate and upload micro-lectures and an accompanying quiz question as part of an end-of-semester project. Details will be made available on Canvas.

Exams: Exams are in-person, closed-note/book/internet/phone. The final exam is optional. If taken, then all 3 exams are weighted equally.

Late work policy: Late work is not accepted. This policy allows me to post solution sets in a timely manner.

I provide one "late pass" exception: you may submit one problem set via as a PDF on Canvas up to 24 hr late with no penalty. Upload your assignment as a SINGLE PDF ONLY (not multiple files). Do not email me that you are using your late pass- no explanation or accounting is needed.

If you have already used your "late pass", then further late work will not be accepted.

If exceptional circumstances cause you to need further extensions or extensions on multiple assignments, contact the Office of Student Life. There is an online form available at https://studentlife.gatech.edu/resources/class-attendance. Medical information should not be emailed directly to a professor.

Regrade policy: Problem sets are graded by a grader according to an agreed-upon rubric. If you believe the rubric was not accurately applied to your work, you will need to turn our work back in to me in-person the next time class meets along with a note of your concern. I will then review go over the entire assignment (not just the noted question) together with the grader. If more than 1 class has passed since you received your grade, then the regrade window is closed.

Other notes on class format and tips for success:

- Prioritize your health.
- Come to class! Attendance has been the biggest indicator of student success in previous semesters.
- Please do not email me if you cannot come to class. Attendance is not graded. You are responsible for figuring out what you missed from online resources or classmates.
- Problem sets are designed to both build and test deeper understanding. Each question is more detailed than what you'd have time for in an exam. Exams questions more closely resemble in-class examples.
- There are only four problem sets. They are not designed to be completed in a single effort. Read the problem sets as soon as they are available. Work on them soon after covering the content in class.
- Again, I recommend turning in problem sets as a hard-copy to ensure maximum feedback.
- There are dedicated class periods where you will work with classmates on shorter, exam-type practice problems. No new material will be presented. This time is to make sure you are keeping up on information, to work out any unclear parts with others and/or me.
- Reach out early when you are "stuck". Questions should be asked on Piazza. If you email a question, I will ask you to post it on Piazza. Please make your questions public. Posts can be made anonymously if desired.

Academic Integrity: Students are expected to abide by the Georgia Tech Honor Code and to avoid academic misconduct, including but not limited to (a) distributing course materials to individuals not in the class, (b) possessing, using, or exchanging improperly acquired information in the preparation of problem sets and exams, and (c) use of material created or written by another individual (including AI). Any student suspected of misconduct will be reported to the Office of Student Integrity.

Accommodations for Students with Disabilities: If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e- mail me as soon as possible in order to set up a time to discuss your learning needs.

Serve-Learn-Sustain (SLS): This course is part of Georgia Tech's Serve-Learn- Sustain (SLS) initiative, which provides students with opportunities to combine their academic and career interests with their desire to make worthwhile contributions to the world and build sustainable communities where people and nature thrive. More information about SLS can be found at www.serve-learn- sustain.gatech.edu.

SLS Student Learning Outcomes:

1. Students will be able to identify relationships among ecological, social, and economic systems
2. Students will be able to demonstrate skills needed to work effectively in different types of communities.
3. Students will be able to evaluate how decisions impact the sustainability of communities.
4. Students will be able to describe how they can use their discipline to make communities more sustainable.

CEE 4330: Air Pollution Engineering
Course Schedule

Module 1: Atmospheric Composition	M	21-Aug	1. Air Pollution Regulations	
	W	23-Aug	2. Pollutant Sources; Unit conversions	
	M	28-Aug	3. Atmos Chem and O3	
	W	30-Aug	3. Atmos Chem and O3	Unit Conversion Quiz
	M	4-Sep	Labor Day	
	W	6-Sep	Practice Problems 1	
	M	11-Sep	4. Models	PS 1
	W	13-Sep	4. Models	
	M	18-Sep	Practice Problems 2	
	W	20-Sep	5. Pollutant Transport	PS 2
	M	25-Sep	Review	
	W	27-Sep	**Exam 1**	
Module 2: Gas Controls	M	2-Oct	1. Basics of Control	
	W	4-Oct	2. Combustion	
	M	9-Oct	Fall Break	
	W	11-Oct	3. NOx Controls	
	M	16-Oct	4. Sorption	
	W	18-Oct	Practice Problems 3	
	M	23-Oct	5. Carbon Capture Guest Lecture	Attendance Graded
Module 3: PM Controls	W	25-Oct	6. PM size/composition	PS 3
	M	30-Oct	7. PM Motion/Settling	
	W	1-Nov	8. Primary PM Control	
	M	6-Nov	Practice Problems 4	
	W	8-Nov	9. Secondary PM Control	PS 4
	M	13-Nov	Review	
	W	15-Nov	**Exam 2**	
Module 4: New Frontiers	M	20-Nov	Atmospheric composition and radiative forcing	
	W	22-Nov	Thanksgiving Break	
	M	27-Nov	Atmospheric composition and radiative forcing	Climate Quiz
	W	29-Nov	Watch Lectures (no in-person)	Recording and Quiz Q
	M	4-Dec	Know before you go	Peer-generated Quiz (online)
	Dec 13 2:40		**Final Exam (Optional)**	