

# CEE6390 Syllabus

Air Pollutant Formation and Control, 3 credit hours

MW, 3:00-4:15 pm, MoSE 1222

## Instructor Information

Instructor: Jim Mulholland      Email: [james.mulholland@ce.gatech.edu](mailto:james.mulholland@ce.gatech.edu)

Office Hours and Location  
MW 4:15-5:00, EST 3214  
or by appointment

## General Information

### Description

Analysis of air pollutant formation and control through study of radical reaction pathways, combustion chemistry, and removal of particles and gaseous pollutants from gas streams.

### Prerequisites

Graduate standing or consent of instructor

## Course Requirements and Grading

Assignment	Weight
Homework (5)	25%
Paper (1)	5%
Exam (2)	70%

### Description of Graded Components

Five homework sets will be assigned during the semester. You may work alone or in groups to complete the homework assignments, but individual solutions are required. If you do work in groups, write group member names at the top of your solution. Homework will be collected at the start of class on the day it is due.

### Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	85-100%
B	70-84%
C	60-69%
D	50-59%
F	0-49%

## Course Materials

Course Text (not required, but course follows most closely the Heinsohn and Kabel text)

*Sources and Control of Air Pollution*, R.J. Heinsohn and R.L. Kabel

*Air Pollution Control: A Design Approach*, C.D. Cooper and F.C. Alley

*Fundamentals of Air Pollution*, R.C. Flagan and J.H. Seinfeld

*Air Pollution: Its Origin and Control*, K. Wark, C.F. Warner, W.T. Davis

## **Additional Materials/Resources**

Lecture slides for each week, homework assignments, review materials, and homework and exam solutions will be posted on the course Canvas website.

## **Course Expectations and Guidelines**

### **Academic Integrity**

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit <http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

### **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.

### **Attendance and/or Participation**

Attendance will not be taken regularly. However, attendance and participation are important to your learning.

If you wish to meet with me outside of office hours, please email me to set up a time. I would be happy to discuss your goals for the course, for your Georgia Tech education, and for your career.

### **Extensions, Late Assignments, and Re-Scheduled/Missed Exams**

No homework will be accepted late unless a prior arrangement has been made with the instructor. Makeup exams, either before or after the scheduled exam dates, will not be given without written documentation of an illness from an M.D. and/or confirmation by the Office of the Dean of Students.

### **Student-Faculty Expectations Agreement**

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

## Course Schedule

wk	class	date	topic	text	slides/videos	HW
1	1	1/6	overview	1.1-6	wk1-intro	
	2	1/8	warmup problems	6.1-7		
2	3	1/13	radical rxns; chain mechanism	1.7-10	wk2-radrxn	HW1 (due 1/24)
	4	1/15	recitation		wk2a,b,c (thermochem)	
3		1/20	holiday			
	5	1/22	recitation	6.9	wk3a,b (ozone formation)	
4	6	1/27	fuels; equiv ratio; stoichiometry	7.1-2	wk4-combustion	HW2 (due 2/7)
	7	1/29	flame temperature		wk4 (Keq-Tad, Tad)	
5	8	2/3	CO & NO emissions	7.3-4	wk5-CO&NOemissions	
	9	2/5	recitation		wk5 (CO-NO)	
6	10	2/10	SO <sub>2</sub> ; particles	7.5	wk6-SO <sub>2</sub> PMengine	HW3 (due 2/21)
	11	2/12	engine emissions	7.6-7		
7	12	2/17	evaporative emissions	8.1-10	wk7-evaporative	
	13	2/19	recitation			
8	14	2/24	review		wk8-review	
	15	2/26	exam 1			
9	16	3/2	exam 1 review			white paper (due 3/13)
	17	3/4	air pollution and health		wk9-health	
10	18	3/9	global air pollution		wk10-global	
	19	3/11	presentations			
		3/16-20	spring break			
11	20	3/23	condensation; sorption	10.1-4	wk11-gascontrol	HW4 (due 4/3)
	21	3/25	thermal oxidation; de-NO <sub>x</sub> ; fgd	10.5-8		
12	22	3/30	PM size, motion, settling	11.1-10	wk12-PM	
	23	4/1	recitation			
13		4/6	no class			HW5 (due 4/17)
	24	4/8	cyclone, electrostatic precipitator	12.1,4	wk13-PMcontrol	
14	25	4/13	wet scrubbers, filter	12.2,3		
	26	4/15	recitation & review		wk14-review	
15	27	4/20	exam 2			