

AT621, Fall 2012
Atmospheric Chemistry
Mondays and Wednesdays, 9-9:50 AM, 212B ACRC

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Objectives:

- To provide students with a familiarity of concepts essential to an understanding of sources of atmospheric trace gases and particles, their chemical and physical transformations, their atmospheric effects, and their removal processes.
- To provide an overview of current topics in atmospheric chemistry research.

Office Hours: Times and locations of office hours will be determined the first week of class.

Text:

John H. Seinfeld and Spyros N. Pandis, *Atmospheric Chemistry and Physics: from Air Pollution to Climate Change*, 2nd Ed. John Wiley and Sons, 2006.

Corresponding readings are listed on the syllabus. The pdf chapters can be obtained through the CSU library: <http://catalog.library.colostate.edu/>

Daniel J. Jacob, *Introduction to Atmospheric Chemistry*, Princeton University Press, 1999.

The pdf chapters can be obtained through the author's website: <http://acmg.seas.harvard.edu/people/faculty/djj/book/>

Lecture notes will be distributed for the class.

Course Structure and Grading Criteria:

Periodic homework is assigned and is due at the start of the class indicated. No late homework assignments will be accepted without prior approval by the instructor. Homework will be graded and returned.

There will be two exams. Exams are designed to test basic concepts and problem solving ability and are closed book and closed notes.

Each student is to prepare and deliver an oral presentation on a topic of their choice, related to the material discussed in this course. This project will require independent research and must include an appropriate literature survey.

Grades are weighted as follows:

Homework: 30%

Exam 1: 20%

Exam 2: 20%

Project: 30%

Project:

Each student is encouraged to develop his/her own project topic idea. A list of possible ideas will be provided, but should not be considered as limiting. Topics must deal with some aspect of atmospheric chemistry. Project proposals are due in October and will be reviewed by the instructor to ensure project criteria are met. Students will make oral presentations of their project near the end of the semester. Further guidelines and grading criteria will be distributed early in the course.

Date			TOPIC/Lecture Notes Reading Assignment	Other Reading (pp=Seinfeld & Pandis; Ch=Jacob)	HW and Project Due Dates
August	20	M	Intro/Course Outline/Review of Chemistry Concepts	Jacob Ch 1	
	22	W	Review of Chemistry Concepts	75-93; J Ch 9	
	27	M	Structure of the Atmosphere/Transport Processes	1-19, 980-996, J Ch 4	
	29	W	Lifetimes/Biogeochemical Cycles	900-914, 932-938; J Ch 6	HW 1 (<i>basic concepts</i>)
September	3	M	NO CLASS (Labor Day)		
	5	W	Modeling of Biogeochemical Cycles	21-27; J Ch 3	
	10	M	Some Important Chemical Cycles	38-47, 52-55	
	12	W	Some Important Chemical Cycles	27-38, 47-52	HW 2 (<i>atmospheric structure / box models / cycles</i>)
	17	M	Principles of Photochemistry	98-135	
	19	W	Principles of Photochemistry	204-219	HW 3 (<i>photochemistry</i>)
	24	M	Stratospheric chemistry	138-169; J Ch 10	
	26	W	Stratospheric chemistry	169-195	
October	1	M	Chemistry of the Background Troposphere	219-235, 242-259; J Ch 11	
	3	W	Chemistry of the Background Troposphere	261-265	HW 4 (<i>stratospheric chemistry</i>)
	8	M	Review		Review
	10	W	EXAM 1		EXAM 1
	15	M	Combustion Sources of Pollutants / Urban Air Chemistry and Smog	235-241; J Ch 12	
	17	W	Combustion Sources of Pollutants / Urban Air Chemistry and Smog	Finlayson-Pitts article	Project Proposal
	22	M	Introduction to aerosols	55-62, 368-389; J Ch 8	
	24	W	Particle size distributions	350-368	HW 5 (<i>smog chemistry</i>)
	29	M	Visibility	691-714	
	31	W	Introduction to atmospheric aqueous phase chemistry	284-291, 547-549	
November	5	M	Aqueous phase chemical equilibria	291-306	
	7	W	Aqueous phase chemical kinetics	306-324	HW 6 (<i>particles and visibility</i>)
	12	M	Multiphase chemistry: The role of clouds Acid Rain	954-971; J Ch 13	
	14	W	Review		HW 7 (<i>aqueous chemistry</i>)
	19	M	<i>No Class - Thanksgiving Holiday</i>	<i>No Class</i>	<i>No Class</i>
	21	W	<i>No Class - Thanksgiving Holiday</i>	<i>No Class</i>	<i>No Class</i>
	26	M	Special Topic		Review / Final Abstracts
	28	W	EXAM 2	EXAM 2	EXAM 2
December	3	M	Presentations (double session to be scheduled)	Presentations	Presentations
	5	W	Presentations (double session to be scheduled)	Presentations	Presentations