ATS621, Fall 2014
Atmospheric Chemistry
Monday and Wednesday, 9 – 9:50, 212B ACRC

Instructor: Prof. Emily Fischer
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Student learning goals: 1) Understand quantitatively how emissions, transport, chemistry and deposition impact atmospheric chemical composition; 2) Explain the chemical and physical mechanisms behind ozone depletion, air pollution and acid rain from the molecular to global scales; 3) Develop skills needed for further specialized study on atmospheric composition relative to air pollution and climate change.

Emily's Office Hours: Monday 2-3; Thursday 3-4
Jake's Office Hours: Tuesday 3-4; Friday 2-3

Required / Primary Texts:
Introduction to Atmospheric Chemistry, **D.J. Jacob** Princeton University Press, 1999
PDF versions of the chapters can be obtained here: http://acmg.seas.harvard.edu/people/faculty/djj/book/
Atmospheric Chemistry and Physics, **Seinfeld and Pandis,** Wiley-Interscience, 2006.
Corresponding readings are listed on the syllabus, and the pdf chapters can be obtained through the CSU library: http://catalog.library.colostate.edu/

Course Materials: There is a RamCT Blackboard site for this class. All course materials will be posted there.

Other Helpful Atmospheric Chemistry Texts:
1. *Chemistry of the Upper and Lower Atmosphere,* **Finlayson-Pitts and Pitts**, Academic
2. *Introduction to Atmospheric Chemistry,* **P.V. Hobbs** Cambridge University Press
3. *Physical Chemistry for the Atmospheric Sciences* **P.V. Hobbs** Ibid.

Course Structure and Grading:
Periodic homework is assigned and is due at the start of the class indicated. No late homework assignments will be accepted without prior approval. There will be two exams. Exams are closed book and closed notes. Each student will prepare and deliver an oral presentation on a topic of their choice, related to the course material. This project will require independent research and must include an appropriate literature survey.

Grades are weighted as follows:
Homework: 30% Exam 1: 25% Exam 2: 25% Project: 20%

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.

Statement on Academic Integrity
This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog (http://www.catalog.colostate.edu/FrontPDF/1.6POLICIES1112f.pdf) and the Student Conduct Code (http://www.conflictresolution.colostate.edu/conduct-code). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

Contact Hours: 2 (At least 2 hours of effort are expected to complete homework assignments outside of class for each hour of class time.

Fall 2014 Semester Dates			Topic	Reading Chapters = Jacob pp = S & P;	HW and Project Due Dates
August	25	M	Intro / Course Outline/ Review of Chemistry Concepts	Chapter 1	
	27	W	Review of Chemistry Concepts / Kinetics	Chapter 9	
September	1	M	UNIVERSITY HOLIDAY – NO CLASS		
	3	W	Atmospheric Structure	Chapter 2	HW1: Basic Concepts
	8	M	Simple Models / Lifetimes	Chapter 3	
	10	W	Dry Deposition	S&P: 900-914 S&P: 932-954	
	15	M	Wet Deposition		HW2: Box Models
	17	W	Atmospheric Transport	Chapter 4	
	22	M	Biogeochemical Cycles	Chapter 6	
	24	W	Biogeochemical Cycles	Chapter 6	
	29	M	Principles of Photochemistry	Chapter 9.3 S&P: 108-128	HW3: Deposition / Biogeochemical cycles
October	1	W	Stratospheric Chemistry	Chapter 10 20 Q&A about the O_3 Layer	
	6	M	Stratospheric Chemistry	Chapter 10 S&P: 138-195	
	8	W	Chemistry of the Background Troposphere	Chapter 11	HW4: Stratospheric Chemistry
	13	M	Chemistry of the Background Troposphere	Chapter 11	
	15	W	**EXAM 1**		
	20	M	Ozone and Urban Air Pollution	Chapter 12	Project Proposal
	22	W	Ozone and Urban Air Pollution	Chapter 12	HW5: Tropospheric Chemistry
	27	M	Introduction to Aerosols (Importance / Overview of Sources)	Chapter 8	
	29	W	Introduction to Aerosols (Size Distributions)	S&P: 350-389	
November	3	M	Aqueous Phase Chemistry: Chemical Equilibria	S&P: 291-306	HW6: Oxidation Modeling with AtChem
	5	W	Aqueous Phase Chemistry: Chemical Kinetics	S&P: 306-324	
	10	M	Visibility / Aerosol Removal Mechanisms	S&P: 691-714	
	17	W	Acid Deposition	Chapter 13 S&P: 954-971	HW7: Aerosols and Aqueous Chemistry
	24	M	FALL RECESS – NO CLASSES THIS WEEK		
	26	W			
December	1	M	Air Quality Regulations and Health		Project Final Abstracts Due
	3	W	Project Presentations		
	8	M	Project Presentations		
	10	W	**EXAM 2**		