ENVIRONMENTAL CHEMISTRY 630 [MWF 9:55 Chemistry 2311]

Fall 2017

Department of Chemistry
University of Wisconsin, Madison

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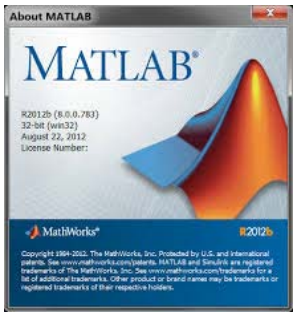
Location of Instructor Office Hours: Chemistry 4355
Instructor Office Hours: M/F 10:45 – 11:45AM
Course Website on Learn@UW: https://learnuw.wisc.edu/

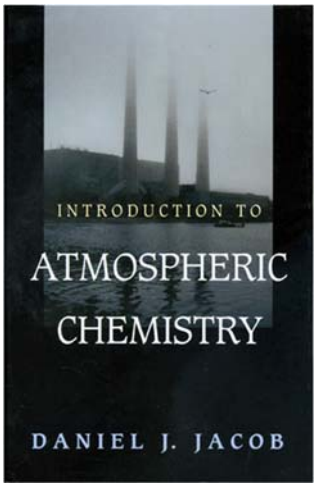
Course Objectives:

Chemistry 630 will discuss the composition and chemical transformation of Earth's atmosphere, focusing on the spatial and temporal evolution of trace gases and aerosol particles. Fundamental concepts from physical chemistry will be used as tools to describe atmospheric processes occurring in both the troposphere and the stratosphere. These tools will be used to assess how anthropogenic perturbations alter the natural state of the atmosphere and how models and measurements are utilized to both describe and predict these changes. Specific topics include: Evolution and chemical composition of Earth's atmosphere; applications of the steady-state approximation; residence and renewal time; sources, transformation, transport and deposition of trace gases in the troposphere; air pollution control strategies; stratospheric chemistry.

Resources and Materials:

1. *Introduction to Atmospheric Chemistry*, Daniel Jacob. This book is available online at Daniel Jacob's educational website at Harvard University: http://acmg.seas.harvard.edu/people/faculty/djj/book/index.html
2. *Atmospheric Chemistry and Physics: From Air Pollution to Climate Change*, John Seinfeld and Spyros Pandis.
3. Chemistry of the Upper and Lower Atmosphere: Theory, Experiments, and Applications, Barbara Finlayson-Pitts and James Pitts.
4. Mathworks Matlab, http://www.mathworks.com/





COURSE INFORMATION

Lectures. During lectures, I will introduce principles and illustrate concepts with example questions. Lectures will provide an opportunity for discussion as well as tackling problems in a group. As a result, participation in class is required.

Cell phones should be turned off or silenced. Laptops and tablets can be used in class for note taking, although you are strongly encouraged to take notes by hand. You will be asked to put away your device if it is being used for activities not related to the lecture.

Problem Sets. Problem solving is a crucial aspect of this course and problems will be assigned on a regular basis (ca. 6-8 over the course of the semester). Assignments will be made available at least 7 days before they are due.

Exams. There will be two in-class exams of 50 minutes each. There will not be a written formal final exam. ***No makeup exams will be given***. **Please be alert to these exam dates.** Please report any religious conflicts with exams or laboratory exercises to your teaching assistant by the end of week two.

	Date and Time	Topics Covered
In Class Exam #1	W 10/04	Stratospheric Chemistry
In Class Exam #2	F 11/03	Tropospheric Chemistry

Final Projects. The final project will be comprised of a written paper and oral presentation. Final projects will involve the analysis of atmospheric chemistry data that was previously taken as part of a select group of recent field campaigns. Novel projects will be designed that build on the content and computer modelling learned in this class. More details on the projects and timelines will be given following Exam #2.

Grades. Your final grade will be computed with the following scheme:

	Percent	Notes
In Class Exams (2x, 15% each)	30%	No make-up exams
Problem Sets	40%	Not all P.S. are equally weighted
Final Project and Report	30%	See details above

Your scores are available to you at Learn@UW, within 7 days of the assignment due date. There are no opportunities for extra credit and late problem sets will be accepted for two days after the due date, with a 10% penalty per day late.

ADDITIONAL RESOURCES

Numerous resources are available to assist you with either this course in particular or college life in general. It is up to you to take advantage of these resources to ensure your success both in this course and at UW-Madison.

Students with Disabilities: Appropriate accommodations for lecture, laboratory, discussion, and/or exams can be arranged for students with disabilities. The McBurney Disability Resource Center (http://www.mcburney.wisc.edu/) can provide assistance. Accommodations still must be made well in advance, so please pursue these avenues immediately.

Advising and Counseling Services (University Health Services): College life can be stressful. If you are struggling with your academic course load or other academic issues, your advisor is a good resource. If you are struggling emotionally with anxiety, depression, or other health issues, individual counseling is available at University Counseling and Consultation Services. For more information go their website (http://www.uhs.wisc.edu/home.jsp?cat_id=36) or call 265-5600. Crisis intervention services are also available 24 hours a day by dialing this same phone number and pressing option 9.

Academic Misconduct: It is expected that all students will conduct themselves with honesty, integrity, and professionalism. Any student caught cheating on an exam will receive an F in the course. Any student caught cheating on homework, a quiz, or lab (for instance, copying another person's work or fabricating data) will receive a zero for that assignment. A second infraction will result in an F for the course. More information on what constitutes academic misconduct and policies on handling misconduct can be found in your chemistry lab manual and at the following website: http://www.wisc.edu/students/saja/misconduct/UWS14.html

Course Outline and Calendar:

Week	Start Date	Topic
1	W 9/06	Introductions and Atmospheric Structure
2	M 9/11	Atmospheric Structure and Chemical Kinetics
3	M 9/18	Stratospheric Chemistry
4	M 9/25	Stratospheric Chemistry
5	M 10/02	Stratospheric Chemistry (Exam 1 on 10/04)
6	M 10/09	Atmospheric Instrumentation
7	M 10/16	Tropospheric Chemistry
8	M 10/23	Tropospheric Chemistry
9	M 10/30	Tropospheric Chemistry (Exam 2 on 11/03)
10	M 11/06	Aerosol Particles
11	M 11/13	Aerosol Particles
12	M 11/20	Aerosol Particles (No Class on 11/22 or 24)
13	M 11/27	Presentations
14	M 12/04	Presentations
15	M 12/11	Presentations