EAS/CHEM 4740 ATMOSPHERIC CHEMISTRY SPRING 2011

Class Meetings

12:05 – 1:25, T Th, January 11 – April 28, Room L-1175 ES&T Bldg.

Holidays: March 22 & 24 (Spring Break).

Instructor

Professor Paul H. Wine

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Office Hours: Tuesday, 2:00−3:00, Wednesday, 10:30−11:30, or by appointment.
During the week of Exam 1 (February 21−25), Wednesday office hour will be switched to Monday (also 10:30−11:30).

Teaching Assistant

Terry Lathem

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Textbook

Introduction to Atmospheric Chemistry by D.J. Jacob, Princeton University Press, 1999, ISBN 0-691-00185-5.

Prerequisites

Freshman Chemistry; First Semester Sophomore Physics; Calculus (3 semesters); Thermodynamics.

Description

This course provides a general chemical description of the Earth atmospheric system with a major focus on the two lowest layers of the atmosphere, i.e., the troposphere and the stratosphere. The interactive coupling between sources, sinks, chemical transformations, and transport processes in controlling the distributions and temporal variability of atmospheric trace gases and aerosols will be stressed. Major environmental issues such as global warming, stratospheric ozone depletion, and regional air pollution will be discussed.

Electronic Dissemination of Course Material: T-Square.

GRADING POLICIES

Exams

Two closed-book exams will be given during the semester. The exam dates are Tuesday, February 22 and Thursday, April 14. Each exam will count 20% of the course grade.

Final Exam

A three-hour closed-book final exam will be given. According to the official Georgia Tech Final Exam Schedule, the exam will take place on Tuesday, May 3 at 11:30 AM. The final exam will be comprehensive, i.e., cover all course material, and will count 25% of the course grade.

Homework

Homework problems will be assigned periodically and will be graded. Collaboration with other students on homework is permitted, but each student should turn in his/her own work in his/her own writing. Homework will count 15% of the course grade.

Poster Presentations

During the last two scheduled lecture periods, each student will make a poster presentation (along with a short oral introduction) on a topic mutually agreed to by the student and the instructor. The deadline for finalizing a topic will be Wednesday, April 6. The presentation, which will be graded on visual quality, content, quality of the oral introduction, and quality of answers to questions posed by the poster viewers (2 or 3 of whom will be experts recruited by the instructor), will count 20% of the course grade.

Changes in Exam Grades

Changes in exam grades must be requested within *one week* of the class period that the graded exam is returned to students; exam grades become "carved in stone" after this one week period.

How Will Borderline Grades be Determined?

If a student is on the borderline between two grades, the decision on whether they should get the higher or lower grade will be based on (1) class attendance *and* participation and (2) performance on the final exam.

Honor Code

Students are expected to adhere to the Georgia Tech honor code (http://www.deanofstudents.gatech.edu/ Honor/).

SYLLABUS

Introductory Chemical and Physical Description of the Atmosphere
Lectures: January 11 & 13 Reading: Jacob, Chapters 1, 2

The Use of Simple Models in Atmospheric Chemistry
Lectures: January 18, 20, & 25 Reading: Jacob, Chapter 3

Atmospheric Thermodynamics and Transport
Lectures: January 27 and February 1 & 3 Reading: Jacob, Chapter 4

The Greenhouse Effect and the Carbon Cycle
Lectures: February 8, 10, 15, & 17 Reading: Jacob, Chapters 6 and 7

EXAM 1 (February 22)

Atmospheric Aerosols
Lectures: February 24 & March 1 Reading: Jacob, Chapter 8

LAST DAY TO DROP COURSE WITH A GRADE OF "W" (Friday, March 4)

Chemical Kinetics and Photochemistry Applied to the Atmosphere
Lectures: March 4 & 9 Reading: Jacob, Chapter 9

Stratospheric Chemistry
Lectures: March 10, 15, 17, 29, & 31 Reading: Jacob, Chapter 10

Chemistry of the Clean Troposphere
Lectures: April 5, 7, & 12 Reading: Jacob, Chapter 11

EXAM 2 (April 14)

Chemistry of the Polluted Troposphere
Lectures: April 19 & 21 Reading: Jacob, Chapter 12

Presentations
Lectures: April 26 & 28

FINAL EXAM: Tuesday, May 3 at 11:30 AM

The above exam and presentation schedule is "carved in granite." The above lecture schedule is only an estimate. It is subject to change over the course of the semester.