Air Pollution Physics and Chemistry EAS 6790

Fall 2004
Monday, Wednesday, Friday 2:05 to 2:55
Room Sustainable Education 110

Instructor: Rodney Weber
Phone 404-894-1750
rweber@eas.gatech.edu

Office: ES&T 2236

Course Objective: To provide an introduction to the physics and chemistry of tropospheric air pollution

Reference Books:

Atmospheric Chemistry and Physics, From air pollution to climate change, J.H. Seinfeld, S. N. Pandis, John Wiley and Sons, 1998.

Introduction to Atmospheric Chemistry, D. Jacob, Princeton University Press, 1999.

Atmospheric Pollution, History, Science, and Regulation, M. Z. Jacobson, Cambridge University Press, 2002.

Air Pollution Meteorology and Dispersion, S. P. Arya, Oxford University Press, 1999.

Syllabus

1. Organizational
2. A brief history of air pollution
   Air pollution and regulation history, current regulations, air pollution trends
3. Air Pollution Meteorology
   Background, T and P, Barometric Law
   Geostrophic Flow, Coriolis Force, Geostrophic Balance, Global Circulation of the atm.
   Equation of state, adiabatic processes, modifications for moist air, atm stability
   Atmospheric Systems and pollution transport, Turbulence and pollution transport
   Plume Dispersion
4. Air Pollution Chemistry, Ozone formation
   A review of: chemical kinetics, organic chemistry
   Photolysis of atm. oxygen
   Oxidizing power of the troposphere
   Chemistry of photochemical smog (ozone)

Midterm 1

5. Atmospheric aerosols
   The size distribution function
   Sources, Sinks, and processing
   Radiative effects and visibility
6. Acid Rain
   Natural precipitation, Aqueous phase acid chemistry
7. Air Pollution Modeling

Grades: 25% midterm, 30% Final Exam, 25% Homework, 20% Project (Paper/Presentation)