EOS 896 Measurement Techniques in Atmospheric Chemistry
Syllabus Spring 2007

GENERAL INFORMATION

Textbook: TBD

Laboratory: There will be 4 individual experiments for this course. A bound notebook and safety glasses are required for the laboratory.

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Office Hours: TBA in class.

LECTURE INFORMATION

MW, 3:40-5:00 pm, Murkland G16

This course provides an overview of *contemporary* instrumental methods used in atmospheric chemistry and biogeochemical research. Techniques that will be covered include: gas chromatography, mass spectrometry, chemical ionization, HPLC, ion chromatography, aerosol scattering and absorption, UV absorption, chemiluminescence, and various other spectrochemical methods. Significant time will be devoted to computer control and acquisition of electronic signals, sampling inlet designs, vacuum techniques, as well as various calibration processes. The lectures are augmented by a hands-on laboratory component where students set-up, operate, and collect actual field data using research grade instrumentation and software. The topics covered and the approximate number of lectures are found on the EOS 896 Lab & Lecture Schedule. The lecture portion of the class will consist of a midterm exam, four take-home problem sets, a presentation and a final exam. Examination questions will be taken from the material covered in lecture and the laboratory experiments. Reading from the current literature will also be required for a sound understanding of the state-of-the-art chemical instrumentation used in this course. The instructor may assign special projects on instrumental methods as time permits.

LABORATORY INFORMATION

A total of four labs will be completed every third week during the semester. All laboratory work will be done in small groups because of the limited instrumentation available for each experiment. However, students will be required to keep a record of their experiments in an individual laboratory notebook. Also, it is imperative that each student understands the experimental procedures, results and calculations from each lab. Understanding the laboratory material is very important for success in the lecture portion of the course.

The handout for most experiments will contain two sections. The first section is designed to familiarize the student with the piece of equipment. The second section is designed to solve a specific question. The second part will not provide a detailed method for solving the question, but will provide suggestions on how to best solve the problem. The laboratory reports should be typed using a scientific publication format. A proposed lab schedule is also provided in the EOS 896 Lab & Lecture Schedule. All reports will be due during the next lab period and will be worth 50 points. To pass the course, all labs must be completed and submitted.

EXAMINATIONS AND GRADING

Problem Sets	15%
Mid-term Examination	20%
Final Examination	30%
Laboratory Reports	15%
Presentation	20%

EOS 896 Lecture & Lab Schedule

This is a **tentative** schedule for the lecture part of the course.

Week	Topics
1	Introduction
2	Signals and Noise/Vacuum Techniques
3	Gas Sampling, Treatments, Interferences and Standards
4	Introduction to Chromatography
5	Gas Chromatography
6	HPLC/IC
7	Mass Spectrometry
8	Ionization Techniques in MS
9	**Mid-Term Exam**
10	EMR, Spectrometric Components
11	Atomic and Molecular Spectroscopy
12	Atomic and Molecular Spectroscopy
13	Sampling and Collection of Particles/Physical Characteristics – Mass and Size
14	Composition Measurements/Real Time Techniques
15	**Presentations**
16	**Final Exam**

This is the **tentative** lab schedule for the semester. Each section will be split up in to small groups for each experiment.

Week	Experiments
1	Lab Safety/Overview
4	GC-ECD/FID/MS
7	PTR-MS
10	O3/NO/NO2
13	TBD