ADVANCED ANALYTICAL
CHEM 4213
Syllabus

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I. Course Objectives

This course will discuss the advances principals and practical applications of commonly used modern analytical techniques. This course will focus around three major areas: 1, liquid chromatography; 2, gas chromatography; and 3, sample preparation. However several related topics will also be explored in detail. At the end of this course, a student is expected to have gained the necessary skills to independently develop a analytical analysis method using the methodologies we have discussed in class.

II. Course Outline

A. Liquid Chromatography
1. Overview
2. Reverse-phase
3. Normal phase
4. Ion-exchange
5. Size-exclusion
6. Affinity-based

B. Gas Chromatography
1. Capillaries
2. Stationary phases
3. High speed GC
4. GC detectors

C. Sample Preparation
1. Extractions
2. SPE
3. SPME

D. Other Techniques
1. Mass spectrometry
2. Capillary electrophoresis
3. X-ray Spectroscopy

III. TEXT

No text is required for this course. However, the textbooks used in the prerequisites (CHEM

3425 and CHEM 3525) would be very useful. Much the course content and lecture information is available on the internet, so internet access is necessary.

IV.GRADING SYSTEM

A. Evaluation Procedures

1. *Exams*

   a. Only one exam will be given in this class. It will be a take home final exam focused on the ability to apply the discussed methodologies. This exam is worth 70% of your course grade.

2. *Laboratories*

   a. Laboratory reports are **due in one week** following experiment. All reports should be prepared using a word processor and spell-checked. Late reports are penalized 2 points for each day late.
   b. The laboratory notebook will be used only to collect data and record experimental observations (data). Laboratory notebooks will be taken up randomly and graded for completeness, format, and neatness.
   c. All laboratory experiments **must be completed** in order to receive a grade for the laboratory portion of this class.
   d. The average of your laboratory grades is worth 30% of your course grade.

V. AMERICAN WITH DISABILITIES ACT

If you need special accommodations in this course due to a documented disability, please contact Student Support Services immediately. It is your responsibility to do so.

VI. CLASS POLICIES

(A) Attendance

1. Regular lecture attendance is expected, however you are not penalized for not attending lectures. Late assignments will not be accepted.
2. Laboratory and exam attendance is mandatory unless **prior** arrangements are made.

(B) Laboratory / Safety Rules

1. Safety glasses **must** be worn at all times by every person who steps into the laboratory. NO EXCEPTIONS. Failure to observe this precaution or other safety practices will result in reduction of grade and/or dismissal from the course.
2. A laboratory coat is recommended during the experiments.
3. **Only** closed toed shoes will be permitted in the laboratory. No flip-flops, sandals, or other open-toed shoes are allowed.
4. Smoking, eating, and drinking in the laboratory are prohibited at all times.
5. No unauthorized preparation or experiments are to be attempted at any time.