Course: Instrumental Methods of Analysis Lab (CHEM-4234) 2 credits
Instructor: Dr. Arthur R. Murphy
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Office Hours: MWF 11:00 AM – NOON and by appointment.
Semester: Spring 2005
Required Text: None. Handouts for the experiments will be distributed.
Classroom, Day and time: TBA, Wednesday, 5:25 PM – 9:00 PM

2004 – 2006 Catalog Description:
Practical laboratory experiments in absorption, emission, and interpretative spectroscopy, electroanalytical methods, chromatography, and elementary electronics.

Intended Audience:
This course is designed for students majoring in chemistry. Students majoring in other Natural Sciences may also find the course of interest.

Teaching Methodologies:
This is a hands-on course in which student laboratory activities are closely monitored. The experiments which will be performed are designed to complement material which will be presented in the lecture portion of the course.

Course Objectives and Outcomes:
Objective 1: Students should understand applications and techniques of atomic and molecular spectroscopy.

   Outcome 1.1: Students will perform a variety of experiments using IR, UV, Visible, AA, and fluorescence.

Objective 2: Students should understand applications and techniques of electroanalytical chemistry.

   Outcome 2.1: Students will perform a variety of experiments using potentiometry, and coulometry.

Objective 3: Students should understand simple electronic circuits and their use.

   Outcome 3.1: Students will perform a variety of experiments in analogue and digital electronics.
   Outcome 3.2: Students will learn about Op Amps.

Laboratory Safety:
All students are expected to follow all laboratory safety and etiquette rules. These rules will be distributed during the first laboratory period. Equipment is not to be abused, and the lab is to be kept clean and orderly. Points will be deducted for violations of any of these rules.

Experiments:
Experiments will be chosen by the instructor from the following list:

1) The Analysis of a two component mixture.
2) Nephelometry
3) Photometric titrations
4) Fluorescence
5) Determination of a formula of a complex using the mole ratio method and/or the method of continuous variations.
6) Coulometric Titrations
7) Conductometric Titrations
8) Determination of I- using an ion selective electrode
9) Potentiometric titrations of Phosphoric acid and mixtures
10) A computer exercise in simplex techniques
11) Interpretive spectroscopy (Computer presentations and lab exercises)
12) IR of aldehydes and ketones. Sample preparation techniques
13) Review of elementary electronics, op amps, and digitals circuitry
14) Introduction to interfacing
15) HPLC computer simulation and experiment
16) Scanning Tunneling Microscopy
17) Atomic Absorption Spectroscopy

Syllabus for Instrumental Methods of Analysis (continued)

Tentative Schedule for the Experiments

During the first laboratory section, a laboratory experiment schedule will be established.

Policies:
The last day for withdrawing from the course with a grade of "W" is Apr 1, 2005

Grading Policy:
The laboratory grade is based entirely on the laboratory reports submitted by each student. Important factors are:

1) Neatness
2) Clarity
3) Thoroughness
4) Accuracy
5) Discussion of errors
6) Adherence to the lab report format that will be distributed during the first laboratory period.