

FAIRLEIGH DICKINSON UNIVERSITY

SONS -CHEMISTRY (TEANECK CAMPUS)

Course: Instrumental Methods of Analysis Lab (CHEM-4234) **2 credits**

Instructor: Dr. Arthur R. Murphy

Office: Dickinson Hall Room 4413

Phone Number: (201)-692-2322

e-mail: arthur_murphy@fd.edu

Office Hours: M 10:00 AM – NOON

F 10:00 AM – 10:50 AM

and by appointment.

Semester: Spring 2009

Required Text: None. Handouts for the experiments will be distributed.

Classroom, Day and time: TBA, Wednesday, 5:25 PM – 9:00 PM

2008 – 2010 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. spectroscopy.

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

Objective3: 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

Syllabus for Instrumental Methods of Analysis (continued)

- 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 digital circuitry
- 14) Introduction to interfacing
- 15) HPLC computer simulation and experiment
- 16) Scanning Tunneling Microscopy
- 17) Atomic Absorption Spectroscopy

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 3, 2009

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.

Note that sharing of computer files in their entirety or in part is not allowed.