

REGULAR COURSE SYLLABUS

School of: Letters, Arts & Sciences

Department: Chemistry

CIP Code: 40.0502

Prefix & Course Number: CHE 4110

Crosslisted With*: _____

Course Title: Instrumental Analysis Laboratory

Check All That Apply: Required for Major: Required for Minor: _____ Specified Elective: _____

Required for Concentration: _____ Elective: _____ Service Course: _____

Credit Hours: 2 (0+6)

Total Contact Hours per semester (assuming 15-16 week semester):

Lecture _____ Lab 90 Internship _____ Practicum _____ Other (please specify type and hours): _____

Schedule Type(s): L Grading Mode(s): L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

** NOTE: This information must be included in the course description.

Restrictions (Variable Topics Course): None

Prerequisite(s): CHE 3000, CHE 3010, CHE 3100, CHE 3110; CHE 3190 or 3260

Corequisite(s): CHE 4100

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:

Prerequisite(s):

Corequisite(s):

Prerequisite(s) or Corequisite(s):

Catalog Course Description:

This course provides a laboratory study of instrumental analytical methods, employing electromagnetic radiation, magnetic resonance, mass spectrometry, and chromatography. Chemical literacy and report writing are emphasized.

APPROVED:

Department Chair **OR** Program Director

Dean **OR** Associate Dean

Associate VP, Academic Affairs

10/7/05

11/18/05 Date

2/6/06 Date

Date

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Required Reading and Other Materials will be equivalent to:

No text book will be required for this laboratory. Information will be obtained from current Chemistry Journals and from handouts.

Specific, Measurable Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to:

1. Describe in words and diagram the schematic of each instrument listed in the course outline.
2. Describe the theory of operation of each instrument listed in the course outline.
3. Describe the application and limitations of each instrument listed in the course outline.
4. Determine the structure of common organic compounds from the results obtained from these instruments.
5. Perform quantitative analysis on instruments whenever feasible.
6. Interpret simple mass spectrum, IR and NMR spectrum.
7. Perform chromatographic separation and clean ups.
8. Use several types of detectors for HPLC and GC.
9. Use Scifinder Scholar to research a topic.

Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision) (format: I, A, 1, a, etc.):

A. HPLC

- a. instrument operation
- b. hands-on experience
 - sample preparation
 - instrumental analysis
 - interpretation of results

B. Gas Chromatograph

- a. instrument operation
- b. hands-on experience
 - sample preparation
 - instrumental analysis
 - interpretation of results

C. Infrared Spectrophotometer

- a. instrument operation
- b. hands-on experience
 - sample preparation
 - instrumental analysis
 - interpretation of results

D. NMR

- a. instrument operation
- b. hands-on experience
 - sample preparation
 - instrumental analysis
 - interpretation of results

E. Mass Spectrometer

- a. instrument operation
- b. hands-on experience
 - sample preparation
 - instrumental analysis
 - interpretation of results

F. Capillary Electrophoresis Spectrophotometer

- a. instrument operation
- b. hands-on experience
 - sample preparation

CHE 4110

- instrumental analysis
- interpretation of results

Evaluation of Student Performance (format: 1, a, i, ii, etc.):

Students will write formal reports on each analysis performed. These reports will be graded on content and accuracy of the analysis. Students will submit a proposal for an analysis based upon a literature search using SciFinder Scholar. A written final examination will be given at the end of the semester. The final grade will be determined by averaging the grades from the reports, the proposal and the final examination.