

CHEM 6283 - *Electroanalytical Chemistry*

Course Syllabus

Spring, 2012

Catalog Description: (3-0-3) Coulometry, electrolytic separations, polarography, chronopotentiometry, coulometric titrations, voltammetry, and hydrodynamic electrochemical methods of analysis.

Pre-requisites: none

Instructor: Dr. Lawrence A. Bottomley
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Office Hours: MWF 2-3

Objectives: This course is a rigorous examination of theory and practice of electroanalytical chemistry. Students completing this course will be:

- Knowledgeable of current electroanalytical techniques
- Comprehend the factors that must be controlled to obtain reliable and reproducible data from electroanalytical experiments
- Capable of identifying the most appropriate electroanalytical technique for a specific analysis
- Experienced in the analysis of data using current theoretical models
- Skilled in the synthesis of information from results obtained from two or more electroanalytical techniques
- Adept at evaluating the electrode reaction mechanism from data obtained using several electroanalytical techniques

Lecture topics:

Review of the basics of electrochemistry
potentiometry
descriptions of the double layer
chronoamperometry
chronocoulometry
chronopotentiometry
voltammetry in quiescent solution
hydrodynamic voltammetry
impedance spectroscopy
chemically modified electrodes
spectroelectrochemistry
electrochemical imaging methods

Lectures will be given MWF 1:00-1:55 PM in M-bldg G021.

Recommended/required texts:

- “Electrochemical Methods” 2nd ed. by Bard and Faulkner (required)
“Fundamentals of Electroanalytical Chemistry” by Monk (recommended)

Assessment:

Course grades will be determined by the student's performance on:

- three midterm examinations (each worth 20%) on 2/10, 3/9, 4/13
- a final exam (30%) scheduled on Monday, April 30th from 2:50-5:40 pm, and
- critiques of ten electrochemical papers (10%) published during the last eight years in the following journals:

Langmuir

J. Electrochemical Society

J. Electroanalytical Chemistry

J. Applied Electrochemistry

Science

Anal. Bioanal. Chem.

Analytical Chemistry

Electrochimica Acta

Electroanalysis

J. Phys. Chem.

Nature

J. Amer. Chem. Soc.

Academic Integrity

Students in this class are expected to abide by the Georgia Tech Honor Code and avoid any instances of academic misconduct, including but not limited to: (a) Possessing, using, or exchanging improperly acquired written or oral information in the preparation of a critique or exam. (b) Substitution of material that is wholly or substantially identical to that created or published by another individual or individuals. (c) False claims of performance or work that has been submitted by the student.

See the published Honor Code for further information.

<http://www.honor.gatech.edu/plugins/content/index.php?id=9>