Classes Meet: TR 9:45-11:00, 213 Buckhout Laboratory  
Course website: http://courses.chem.psu.edu/chem524  

Instructor: T. E. Mallouk  
863-9637  
Office hours TW 1:30-2:30 PM  
205 S. Frear Laboratory  
email: tem5@psu.edu

Learning Goals: The goal of Chemistry 524 is for students to gain an understanding of the principles of electrochemistry along with some practical experience. Potentiometric methods will be discussed in the context of electrochemical equilibrium. Amperometric analytical methods -- chronoamperometry, chronocoulometry, stripping voltammetry, cyclic voltammetry, pulse polarography, AC impedance, and hydrodynamic methods -- will be described from the perspective of mathematical models of mass transport and electrode kinetics. As time permits, special topics and applications, such as spectroelectrochemistry, photoelectrochemistry, ultramicroelectrodes, corrosion, and scanning electrochemical microscopy, will be covered. To complement and reinforce the material learned in class, students will fabricate electrodes, perform cyclic voltammetry and other experiments, and analyze electrochemical data. Equipment will be available in the Mallouk laboratory to do these experiments in small groups on your own time outside of class. We will hold Saturday morning tutorials for students who are not yet familiar with the equipment.


Prerequisites: Students are expected to have an understanding of the chemistry of solutions, potentiometry, and electroanalytical chemistry at the general level of undergraduate junior/senior analytical and physical chemistry courses.

Grading: Grading will be based on problem sets (approx. one per week, 30%), a take-home midterm exam (20%), lab/project reports (20%), and a term paper/oral presentation (30%). Homework assignments and due dates will be posted on the course website: http://courses.chem.psu.edu/chem524. It is your responsibility to turn in your homework on or before the due date. Solutions to problems will be posted on the due date immediately after class, so late homework will not be accepted.

Term Papers and Oral Presentations: In lieu of a final exam, students will write a short (5 - 10 pp.) term paper and make a 15 min. oral presentation to the class on a topic pertaining to current research in electrochemistry. The choice of topics is flexible, but there are certain rules: it must be of interest to your classmates, involve original, current literature sources (no relying on textbooks or a single review article), pertain to electrochemistry, and not be too broad to be reasonably covered in the time allotted. For this assignment, you must obtain approval of your topic by April 2. All term papers will be due on April 16, and will not be accepted later.
**Academic Integrity:** Students in Chemistry 524 are expected to abide by all University policies relating to ethics and academic integrity. Please see [http://www.psu.edu/ufs/policies/](http://www.psu.edu/ufs/policies/).

*The Eberly College of Science Code of Mutual Respect and Cooperation* embodies the values that we hope our faculty, staff, and students possess and will endorse to make The Eberly College of Science a place where every individual feels respected and valued, as well as challenged and rewarded. Please see [www.science.psu.edu/climate/Code-of-Mutual-Respect-final.pdf](http://www.science.psu.edu/climate/Code-of-Mutual-Respect-final.pdf).

*The Eberly College of Science is committed to the academic success* of students enrolled in the College's courses and undergraduate programs. When in need of help, students can utilize various College and University wide resources for learning assistance. Please see [http://www.science.psu.edu/advising/success](http://www.science.psu.edu/advising/success).

**Students with Disabilities.** Penn State welcomes students with disabilities into its educational programs. If you have a disability-related need for reasonable academic adjustments in this course, please contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services website at [http://equity.psu.edu/ods/](http://equity.psu.edu/ods/). In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at [http://equity.psu.edu/ods/guidelines/documentation-guidelines](http://equity.psu.edu/ods/guidelines/documentation-guidelines)). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.