CHEMISTRY 434 W  
Fall 2013

Instructor: Tom Trainor  
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Office Hours:  
MW  9:00 am-11:45 pm  
Or By appointment

Lecture:  
M 11:45-12:45 am, Reichardt Building, Room 165

Laboratory:  
TR 8:00-11:00 am, Reichardt Building, Room 137/245

Required Material:  Bound Laboratory Notebook

Course Description
A capstone laboratory course with three major components: 1) experiments related to concepts learned in physical, analytical and inorganic chemistry courses emphasizing kinetics, spectroscopy and thermodynamics; 2) computer use in problem solving, data analysis and word processing; and 3) technical writing with emphasis on preparation of papers for publication.

Course Overview
The goals of this course are to:

1. Give you experience in designing experiments and developing safe/efficient lab practices.
2. Enhance your skills in quantitative analysis of experimental data.
3. Develop your scientific writing skills.

In this course the quality of the experimental data is equally important as your understanding, interpretation, and communication of the results.

Each lecture period will include a review of the lab, an overview of the background material, and discussion. Lab sessions will include independent and group work on specified experiments. Students are expected to come to lab prepared to execute lab work.

The final experiment of the semester will be an independent project, developed in conjunction with the instructor. Based on this project you will present a 25 minute power point presentation with 5 minutes of questions (30 minutes total).

Lab reports should be submitted as single editable document via email. Draft lab reports are required to be submitted to the instructor.

Learning Outcomes
This lab will reinforce concepts and analytical skills in physical/analytical chemistry through experiments, data analysis and development of detailed lab reports.

Important Dates:
Sept 13 – Deadline for late registration
Sept 20 – Deadline for drop
Nov 1 - Deadline for withdrawal
Grades:

- **Notebooks (15%)**: Entries (description, data, observations, calculations etc) for each 6 lab. **Before you can start the lab, a list of all chemicals, supplies, and equipment to be used in the lab must in written in your notebook.** Please tape or staple into your notebook plots, data tables and other materials you generated electronically.

- **Lab Reports (70%)**: Each lab exercise will require a report that will be graded as follows: 50 points for the written portion (format, grammar, ability to express scientific ideas and results), 10 points for the raw data (precision and accuracy), 20 points for data analysis and calculations (depth of discussion), and 20 points for presentation of data (figures, tables, and corresponding captions).

- **Final Project Presentation (15%)**: Oral presentation grade will be based on quality and content of the slides (60%), presentation quality (20%) and ability to address questions (20%).

Lab Policies:

- Lab time is a *premium* and you are expected to spend the lab time performing the lab rather than figuring out how to do the lab (please come to lab prepared).

- If you need more time in order to complete the experiment in the instrumentation or wet chemical laboratories, you must get approval from the instructor.

- You must follow all safety procedures and instrument operating protocols specified for the lab – this includes using correct PPE, being familiar with the MSDS information for all materials used, being familiar with correct containment and spill procedures, and developing/following SOP’s for all methods and instrumentation used.
**Tentative Schedule:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Labs</th>
<th>Notes</th>
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<tbody>
<tr>
<td>1 (sep 9)</td>
<td>Lab 1 – Solid Liquid Equilibrium</td>
<td>First class meeting Sep 9</td>
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<tr>
<td>2 (sep 16)</td>
<td>Lab 1 – Solid Liquid Equilibrium</td>
<td>Sep 19 no lab (oot)</td>
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<tr>
<td>3 (sep 23)</td>
<td>Lab 2 – Cyclic Voltammetry</td>
<td>Sep 23 no lect (oot) – do lect on 24&lt;sup&gt;th&lt;/sup&gt; or 25&lt;sup&gt;th&lt;/sup&gt;. Start Lab 2 26&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>4 (sep 30)</td>
<td>Lab 2 – Cyclic Voltammetry</td>
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<tr>
<td>5 (oct 7)</td>
<td>Lab 2 – Cyclic Voltammetry</td>
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<tr>
<td>6 (oct 14)</td>
<td>Lab 3 - Rotational-Vibrational HCl</td>
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<tr>
<td>7 (oct 21)</td>
<td>Lab 3 - Rotational-Vibrational HCl</td>
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<td>8 (oct 28)</td>
<td>Lab 4 - Kinetics</td>
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<td>9 (nov 4)</td>
<td>Lab 4 – Kinetics</td>
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<td>10 (nov 11)</td>
<td>Lab 5 – Fluorescence</td>
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<td>11 (nov 18)</td>
<td>Lab 5 – Fluorescence</td>
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<td>12 (nov 25)</td>
<td>Make up week / start projects</td>
<td>Nov 28 no class (T-Giving)</td>
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<td>13 (dec 2)</td>
<td>Project Lab</td>
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<td>14 (dec 9)</td>
<td>Project Lab</td>
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<tr>
<td>15 (dec 16)</td>
<td>Finals week</td>
<td>Class presentations</td>
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