**Analytical Instrumental Laboratory**  
**CHEM 413W; Spring 2013**

**Course Name:** CHEM 413W, 3 credits, writing intensive  
**Prerequisites:** CHEM 212, 332 (co.)  
**Location:** Reichardt 165 (lecture); Reichardt 245 (lab)  
**Meeting Time:** M 11:45-12:45 (lecture), MW 2:15-5:15 (lab)  
**Final:** Friday, May 10, 1-3pm

**Instructor:** Dr. Sarah Hayes  
**Office:** Reichardt 188  
**Phone:** 907-474-7118  
**Email:** s.hayes@alaska.edu  
**Office Hours:** M 1-2, by appointment, or drop by when my door is open

**TA:** Amanda Barker  
**Email:** ajbarker@alaska.edu

**Course Website:** http://instrumentalanalysis.community.uaf.edu  
**Blackboard Link:** http://classes.uaf.edu

**Recommended Materials:** You can use whatever edition you want of the texts.  

**Course Description:** A laboratory course focusing on the acquisition and interpretation of chromatographic and spectroscopic data for quantitative chemical measurements. Students will learn effective experimental planning and execution, critical evaluation of experimental data and written communication in the context of the chemical sciences. Much of this course is student-directed and project based. Students are expected to carefully prepare, plan, and execute experiments with minimal instructor input. CHEM 413W builds on previous experience with analytical chemistry (eg CHEM 212). This course is also writing intensive and requires the completion of ENGL 111X, 211X, and/or 213X.

**Instructional Methods:** This class is based on characterizing a product given to each student on the first day of class. Throughout the semester, students will use a variety of instrumentation to characterize different parts of their product both individually and in groups. In lecture, students will learn to correctly apply, diagram, and troubleshoot instruments. They will apply this knowledge in lab by designing experiments and learning to use instruments to characterize their product. After each experiment is completed, written reports will be submitted for instructor and peer review. A final report, largely a revised version of previous reports, and poster will showcase student accomplishments.

**Course Goals:** Students will learn to design an experiment, select appropriate instrumentation, research and apply laboratory procedures, carry out experiments, troubleshoot instruments, analyze data, and write it all up in a scientific report.
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Student Learning Outcomes:

• Students will be able to diagram spectroscopic and chromatographic instrumentation and select the appropriate instrument for a particular problem.
• Students will be able to research and apply instrumental methods for characterizing materials. Then perform the experiment and interpret the results.
• Students will compose a scientific report in the ACS style to justify and document experiments, interpret results, and draw conclusions.

Available Instrumentation: FT-IR, Electron microscopy, ICP-MS, Flame AA, XRF, XRD, GC-MS, HPLC, LC-MS, CE.

Course Evaluation:
There are **1050 total points available** in this class. Grades are assigned on the typical scale 1000-900 A, 900-800 B, 800-700 C, etc. * Extra credit opportunities.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
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<tbody>
<tr>
<td>Worksheets and reading</td>
<td>100</td>
</tr>
<tr>
<td>Project definition</td>
<td>100</td>
</tr>
<tr>
<td>Instrument instructions and presentation</td>
<td>100</td>
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<tr>
<td>Fun instrument instructions</td>
<td>25*</td>
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<tr>
<td>Reports (5 @ 100 each)</td>
<td>500</td>
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<tr>
<td>Procedure, figures, report, review, revisions</td>
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<tr>
<td>Poster, review, and presentation</td>
<td>100</td>
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<tr>
<td>Final report and lab notebook</td>
<td>100</td>
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<tr>
<td>Resources (5 ea up to 25 pts)</td>
<td>25*</td>
</tr>
<tr>
<td><strong>Total points graded</strong></td>
<td><strong>1000</strong></td>
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Additional details for each assignment will be discussed in class and grading rubrics and examples will be available on the course website.

Course Policies:
**Attendance and Tardiness**- Students are expected to attend class and not compromise the experience of other students. A social contract will be negotiated between students and instructor on the first day of class. Makeup labs are not available for this course.

**Honor code and Academic integrity**- Students are expected to conduct themselves in accordance with the UAF Honor code. The Chemistry Department policy states: *Any student caught cheating will be assigned a course grade of F. The students academic advisor will be notified of this failing grade and the student will not be allowed to drop the course.*

**Collaboration**- Collaboration and working in small groups is a key component of classroom and lab time. Students are expected to work together professionally- you don’t have to be BFFs to work together. Disrespect of the classroom learning environment, instructors, and fellow students is not tolerated!

**Late work**- Work is not accepted late. This is to keep us all moving though the material efficiently.

**Disability Services**- I will work with the Office of Disabilities Services (208 Whitaker Bldg, 474-5655) to provide reasonable accommodation to students with disabilities. It is the student’s responsibility to make an appointment with me to discuss appropriate accommodations. A letter from disabilities services must be provided.