Chemistry 413W - Fall 2011
Analytical Instrumental Laboratory

Instructor: Christopher Iceman
Office: Akasofu 334
E-mail: christopher.iceman@alaska.edu

Class: MW 2:15-5:15 F 1:00-2:00
Classroom: Reichardt 165, 246
Office Hours: M 11:00-12:00, T 1:00-2:00, F 3:00-4:00

Course materials
The following materials are required for the course and can be purchased in the UAF bookstore or elsewhere:

- Bound laboratory notebook

The following materials are optional and may assist the student in their studies:

- *Chemistry Experiments for Instrumental Methods* 1st Ed. by Sawyer, Heineman and Beebe
- *Principles of Instrumental Analysis* 6th Ed. by Skoog, Holler and Crouch

Who should take this course?
The analytical instrumentation lab is a wondrous chemistry lab building on skills from previous courses. Students will learn instrumentation technology and troubleshooting. The quantification, interpretation and communication of results in written format is of utmost importance and represents the majority of the class grade. The student will need to carefully prepare, plan and execute experiments using not only the lab materials provided but also outside materials with minimal instructor direction. Chemistry 413W is a writing intensive course and requires completion of ENGL 111X, 211X and/or 213X.

Course expectations and outcomes
Students are expected to attend class as attendance will be monitored. Each day before class the student should read and digest the portions of the laboratory procedure and instrument operating procedures appropriate as per the class schedule, including any supplemental reading. Active learning involves the student utilizing their sensory perception(s) to retain as much information as possible. Students are required to adhere to safe laboratory practices, keep complete laboratory notebooks and employ standard statistical analysis of their results. The goals for this course are to continue build the student’s skills quantifying chemical components, reading critically, formulating questions, completing and designing laboratory experiments and especially by communicating information assimilated throughout the course via lab notebooks, written reports and exams. Class conduct should be professional as well as respectful of the rights other students.

Grading
A total of 2303 points are possible for Chemistry 413W and are explained in the table below. Feedback is an essential part of this course, written as well as in-person review will occur throughout the semester. Grades will be posted to blackboard, which can be accessed from the UAF homepage. Class grades may be adjusted (curved) from the following schedule only in the students’ favor. The professor reserves the right to adjust students grades by up to 10% for supplemental assessment.
Tentative Points and Letter Grades:

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Max Points</th>
<th>Percentage Range</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notebooks</td>
<td>600</td>
<td>100 - 90%</td>
<td>A</td>
</tr>
<tr>
<td>Journal club</td>
<td>103</td>
<td>89 - 80%</td>
<td>B</td>
</tr>
<tr>
<td>Lab reports</td>
<td>600</td>
<td>79 - 70%</td>
<td>C</td>
</tr>
<tr>
<td>Project lab</td>
<td>600</td>
<td>69 - 60%</td>
<td>D</td>
</tr>
<tr>
<td>Poster presentation</td>
<td>300</td>
<td>59% or less</td>
<td>F</td>
</tr>
<tr>
<td>DUCK exam</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2303</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Notebooks and lab maintenance (600 points) – Entries with observations, data, calculations and outline as well as cleanup for each of the labs will be worth 100 points. Prior to lab the chemicals, supplies, procedure and equipment for the lab should be recorded. Notebooks may be collected at anytime during each lab period. Notes, observations and details found on paper *not* bound in lab notebooks will be discarded.

- Journal club participation (103 points) – Class participation and comments for journal club will be worth 10 points per article.

- Lab reports (600 points) – Each of the lab exercises requires a typed journal style report. Lab reports are to be submitted before the start of the lab period on the specified due date. The labs will be graded as follows:

- Project lab (600 points) – Lab plans (oral/written) and reports are to be submitted before the start of the lab period on the specified due date and will be graded similarly to the other labs:
  - Project definition (written report): 100 points
  - Sample and instrumental protocols (written report): 100 points
  - Preliminary analysis (written report): 100 points
  - Final written report (ACS manuscript style): 300 points

- Final project presentation (300 points) – You and your partner will present a poster presentation about the theory, design, implementation, analysis, and results of the project. The oral presentations will be held during the end of year chemistry poster session.

- Exam (100 points) – Students will be evaluated with the American Chemical Society Diagnostic of Undergraduate Chemical Knowledge (DUCK) exam. Details of taking the examination will be given in class. The examination scores will be assessed on a curved scale and will also be used to assist the department in assigning awards.

**Lab policies**
Students are expected to be familiar with all components of the labs in order to spend the lab time on experimental work. Completion of raw data acquisition should be followed by data analysis for
the remainder of the lab period. Additional time to complete the experiment for instrumentation or wet chemical laboratories will require the student to obtain approval from the instructor with at least 24 hours advanced notice. In the case that scheduled office hours are not convenient please feel free to stop by or make an appointment.

Working together on the labs is encouraged, however each student needs submit their own work for the written sections, data analysis, figures, tables, captions and references. Explicitly shared work is prohibited. Regrades are permitted if the student feels a mistake has been made in grading. This request should be submitted in writing for the entirety of the paper to be graded again. Regrade requests must be made within 48 hours of posted grades for the laboratory report. Note that points lost due to late work, tardiness in lab, unexcused absences, shared lab reports or failure to clean up cannot be remitted. Also note that all assignments must be typed. Handwriting on any part of the reports will not be accepted. Late assignments will be assessed a 10% penalty per day.

**Additional coursework details**
The laboratories this semester will concentrate on instrumentation while surveying the fundamentals of analytical chemistry, statistical analysis and control experiments. The lecture each week will focus on background literature, journal club presentations and review of the lab including any modifications and expectations for the written report. This presentation helps to focus laboratory time for completing the experiment rather than procedural details.

The final experiment is a semester long *planned project* where the student and their partner will pick and execute an experiment with selected samples followed by submission of an ACS journal style manuscript. The student and their partner will give a poster presentation that should focus on the theory, design, implementation, analysis and results of the project lab.

**Final exam**
No use of a cell phone, pda, graphing calculator or otherwise will not be allowed during the final exam. The final exam will be a one hour multiple choice exam provided by the American Chemical Society Examinations Institute. Many review text are available and are excellent sources of information to assist students in practicing and preparing for the final exam.
Absences
No make up laboratories will be allowed, an unexplained absence from a lab results in a zero. If the student anticipates an absence (intercollegiate sports, travel for military or university business) the student must talk to the professor before the lab to make possible arrangements. If the absence is unexpected (illness, family or personal calamity) the student must talk with the professor at the earliest possible opportunity. No extensions, makeup or late work will be accepted otherwise.

Ethical considerations
The Chemistry and Biochemistry Department Policy on Cheating states the following:

Any student caught cheating will be assigned a course grade of F. The student's academic advisor will be notified of this failing grade and the student will not be allowed to drop the course.

Examples of cheating include, but are not limited to:

- Copying another student’s answer while taking a quiz or exam
- Using another student’s work while writing lab reports

Students must also adhere to the University of Alaska Honor Code which states in part:

Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in quizzes and examinations.

Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports. No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors. Violations of the Honor Code will result in a failing grade for the assignment and, ordinarily, for the course in which the violation occurred. Moreover, violation of the Honor Code may result in suspension or expulsion.

Disabilities
Students with a physical or learning disability should identify themselves to the Disability Services office, 474-7043, located in the Center for Health and Counseling. The student must provide documentation of the disability. Disability Services will then notify the instructor of special arrangements for taking tests, working homework assignments and doing lab work.
UAF GUIDELINES FOR CORE WRITING INTENSIVE DESIGNATOR:

• General guidelines for 3-credit course with “W” designator

  – The lower-division writing sequence as specified in the Core Curriculum will be a pre-
    requisite for all “W”−designated courses.

  – Instructors are encouraged to have students write an ungraded diagnostic composition
    on or near the first day of class to help assess writing ability and general competence in
    the discipline. [If diagnostic tests indicate that remedial work may be needed, teachers
    can set up specialized tutoring for their students with UAF Writing Center tutors.]

  – Teachers regularly evaluate students’ writing and inform students of their progress. If
    a major written project (research project) is part of the course, the project should be
    supervised in stages. If possible, a writing activity should comprise a major portion of
    the final examination.

  – At least one personal conference should be devoted to the student’s writing per term
    and drafts of papers should receive evaluation from the teacher and/or peers.

  – Written material should comprise a majority of the graded work in the course for it to be
    designated “intensive.” “Written material” can consist of quizzes and exams with short
    answers or essay sections, journals, field notes, informal responses to reading or class
    lectures, structured essays, research projects, performance reviews, lab reports, or any
    forms suitable to the discipline being taught.

• Guidelines for the “W” designator in Technical courses

  – In order to ensure that technical disciplines can meet the goals of the writing intensive re-
    quirements without compromising the technical quality of their courses, such disciplines
    may substitute longer courses or a series of courses (typically 1−credit labs) for each
    of the two necessary 3−credit writing intensive or “W”−designated courses. Courses
    meeting all the general guidelines will, of course, also be acceptable.

  – The longer course option allows the “W” designator for a 4− or 5−credit course in
    which written material comprises a portion of the grade equivalent to “a majority” of a
    3−credit course. The course must also meet the other general guidelines.

  – The series option allows a student to replace one or both 3−credit “W” courses with a
    series of courses, each of which may be less than three credits−e.g., a series of 1−credit
    or 1−credit−equivalent laboratories. Each series, however, must sum to the equivalent
    of at least one 3−credit “W”−designated course. The initial course in the series will
    be designated “W1” and, while less than three credits, will fulfill all the other general
    requirements for a “W.” The subsequent courses will base a majority of the grade on
    written material. Students must take the “W1” course before taking the other courses
    in the series.

** To grade a course on written work means to use the student’s written work as the basis for his
or her grade. Written work is graded mainly on content and organization, with tone, word choice,
sentence structure, grammar, punctuation, and spelling accounting for a smaller fraction of the
grade.