CHEM:2021 Fundamentals of Chemical Measurements

Fall Semester 2017

Version 8/22/17

Instructor
Professor Gary W. Small, 238 IATL, 335-3214, gary-small@uiowa.edu

Class Meeting
Lecture: Tuesday and Thursday, 8:30 – 9:20; W268 CB
Lab. Section A01: Tuesday and Thursday, 9:30 – 12:20; E440 CB
Lab. Section A02: Tuesday and Thursday, 2:00 – 4:50; E440 CB

Office Hours
During lab periods in E440 CB or Fridays 11:30 -1:00 pm in 238 IATL or by appointment.

Teaching Assistants

<table>
<thead>
<tr>
<th>Teaching Assistant</th>
<th>Contact Information</th>
<th>Office Hours</th>
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</table>
| Alexis Ellis       | alexis-ellis@uiowa.edu | 8:30 – 9:30 am Monday  
                     |                     | 8:30 – 9:30 am Wednesday       |
| Cansev Erdem       | cansev-erdem@uiowa.edu | 11:30 am – 12:30 pm Wednesday  
                     |                     | 1:30 – 2:30 pm Monday          |
| Chengxuan Guo      | chengxuan-guo@uiowa.edu | 2:30 – 3:30 pm Wednesday  
                     |                     | 11:30 am – 12:30 pm Friday     |
| Michaella Raglione | michaella-raglione@uiowa.edu | 9:30 – 10:30 am Monday  
                     |                     | 11:30 am – 12:30 pm Monday     |

DEO Contact Information
James Gloer, E331 CB, 335-1350, james-gloer@uiowa.edu

Textbook
Quantitative Chemical Analysis, 8th edition (2010); Daniel C. Harris, W. H. Freeman & Co.
Handouts will also be provided on ICON.

Web Materials
http://icon.uiowa.edu; Fundamentals of Chemical Measurements CHEM:2021:0AAA

Course Objective
The objective of this course is to build skills in the theory and practice of basic laboratory measurements in chemistry. Major emphasis will be placed on titrations, standardization, calibration, error analysis, modeling, and graphical presentation of results.

Basic Course Organization
The course will be divided into lecture and laboratory sections. The basic principles of the experiments and the associated data analysis will be covered in lecture. Initial course material will focus on general procedures for analyzing and presenting data along with learning basic laboratory skills. Basic instrumental measurements are featured in later class assignments.
Policy on Class Attendance

Students are required to complete each laboratory experiment. Failure to perform all laboratory experiments will result in a grade of incomplete for the course. Missed laboratory sessions or exams can be made up with full credit only if the absence is excused. Unexcused absences will result in grade penalties (typically 10%) for the relevant course component. Attendance at lecture is strongly encouraged and points in the grading scheme are allocated for lecture attendance. Two lectures can be missed without penalty. Missed lectures are not penalized if the absence is excused. Examples of excused absences include those due to illness, mandatory religious obligations, official University activities, or unavoidable circumstances. Documentation must be provided to the instructor to support the reason for the absence.

Students participating in University activities must provide a statement before the absence signed by a responsible official that specifies the dates and times the student will miss class. Authorized activities include participation in athletic teams, the marching band and pep band, debate teams, and other recognized University groups, as well as participation in University field trips, service with the National Guard, and jury duty.

Course Requirements / Grading Scheme

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Assignment</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Completion of on-line safety courses</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>Spreadsheet assignment</td>
<td>30</td>
</tr>
<tr>
<td>11</td>
<td>Pre-lab quiz (5 points each)</td>
<td>55</td>
</tr>
<tr>
<td>11</td>
<td>Safety assessment (5 points each)</td>
<td>55</td>
</tr>
<tr>
<td>11</td>
<td>Laboratory performance on Experiments 1-11</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>- Notebook, 2 points each</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Laboratory work (efficiency, cleanup of work area, etc.), 1 point each</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lab Reports (Experiments 1-4, 30 points each)</td>
<td>120</td>
</tr>
<tr>
<td>1</td>
<td>Quantitative accuracy for Experiment 4</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>Quantitative accuracy for Experiment 9</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Lab Reports (Experiments 5-11, 50 points each)</td>
<td>350</td>
</tr>
<tr>
<td>27</td>
<td>Lecture attendance (1.5 points each, maximum of 37 points)</td>
<td>37</td>
</tr>
<tr>
<td>3</td>
<td>Exams (100 points each)</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td><strong>Total Points</strong></td>
<td><strong>1000</strong></td>
</tr>
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Assignment of Grades

Grade assignments will be made on the basis of a curve of the total class distribution of points. Plus/minus grades will be given. The “A+” grade will only be given in an exceptional circumstance. The overall grade distribution will be consistent with the
recommendations of the College of Liberal Arts and Sciences for intermediate-level courses (18% A, 36% B, 39% C, 5% D, 2% F).

**Late Assignments**

Assignments must be submitted to the ICON dropbox by **11:59 p.m.** on the specified due date. Late assignments will be penalized at –0.42% of the maximum score on the assignment per hour after the midnight deadline, rounded to the nearest half point (10% per day). For example, a 30-point assignment submitted at 2:30 am on the day following the due date will be penalized at $2.5 \times (0.0042 \times 30) \text{ pt/h} = 0.32$ or rounded to 0.5 points.

**Adjustment of Grades**

Any adjustment to the grades of assignments, lab reports, or exams must be done within 10 calendar days after the graded work has been returned. For assignments and lab reports, students with questions regarding grading procedures should consult the TA responsible for grading the work. Students with questions regarding graded exams should consult Dr. Small.

**Laboratory Performance Points**

A total of 11 points of the course grade (1 point for each of the 11 experiments) will be allocated to performance in the laboratory. Deductions will be made as appropriate for instances of unsafe laboratory practices, late arrival, failure to clean work area, leaving the laboratory early without permission, etc. Students will be informed when deductions are made.

**Laboratory Notebooks**

Each student must maintain a laboratory notebook. Specific instructions for keeping notebooks are posted on the ICON course website and will be discussed in class. Points in the class grade (2 points per experiment) are allocated for the completion of the notebook entries.

**Pre-Lab Assignments**

For each experiment, there will be two pre-lab assignments that will be due at 8:30 am each Tuesday in which a laboratory experiment is begun.

**Pre-lab Quiz** A pre-lab quiz (5 points) will be available on ICON starting at 5:00 pm on the Thursday prior to the start of a new laboratory experiment. Questions will be multiple choice and drawn from the written procedure for the experiment and/or the associated textbook readings. Access to the quiz will close at 8:30 am on the Tuesday in which the experiment begins.

**Safety Assessment** A safety assessment (5 points) must be completed prior to the start of each experiment. Instructions for completing the assessment, a Word template to use, and an example assessment are available on the ICON course website. Completed safety assessments should be submitted to the appropriate ICON dropbox. The safety assessment must be completed before you can start the experiment.

**Quantitative Accuracy**

Two experiments (Experiments 4 and 9) involve the analysis of unknowns that have certified compositions. For these experiments, in addition to the lab reports, points in the grading scheme will be assigned for the accuracy of your determinations.

**Examinations**
The exams will focus on material presented in both the lecture and laboratory portions of the course. Exams 1 and 2 will be given during the normal lecture period. Exam 3 will be given during the final exam period assigned to the class. Exams 1, 2, and 3 will focus on Experiments 1-4, 5-8, and 9-11, respectively. Each exam will be cumulative relative to the statistics and data analysis material presented in the lecture portion of the course.

Lab Reports

A lab report will be required for each experiment. Items to include in the report are detailed at the end of each experiment information package. A Microsoft Excel template will be provided to you for use in generating the report. All lab reports must be submitted to the appropriate ICON dropbox.

Laboratory Safety

Laboratory safety is a primary concern and you will be expected to act in a safe and professional manner. Eye protection is mandatory. Standard laboratory goggles are required and must be worn at all times, even if you are not actually performing an experiment. Lab coats and gloves are optional. Open toe shoes and short pants are not allowed in the lab. More details on safety procedures will be covered during the first laboratory period.

Computer Usage

Each student will have access to computers in the departmental computer facilities, which are located in W238 and W241 CB.

Equipment Policy

All glassware and other equipment received at the beginning of the semester by a student registered for a given course and assigned a drawer/locker is the responsibility of that student. On the day of check-in, the student must be certain that all the equipment required for the course is in the drawer, the glassware has no chips or cracks and that the equipment is in good working order. The Chemistry Department will replace any glassware or equipment that is defective at the time of check-in. At the end of the semester or at the time the student leaves the course, every piece of glassware and equipment must be returned to the Department without chips or cracks and in good working order. All pieces of glassware or equipment that are missing, broken, or not in good working order will be charged to the student through the University billing system after the close of the semester.

Policy on Academic Honesty and Collaboration

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations. Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels. The University Code of Academic Honesty can be found at [http://clas.uiowa.edu/students/handbook/academic-fraud-honor-code](http://clas.uiowa.edu/students/handbook/academic-fraud-honor-code).
In accordance with the policies outlined above, all work performed in this course is expected to be your own. Some laboratory experiments will be performed in groups of two. However, once you leave the laboratory, each student should prepare his/her own lab report.

Students are permitted and encouraged to discuss general procedures for data analysis, use of Excel, and general questions about the procedures and specific data collected. However, this should be done in the context of completing your own work. Here are several examples:

Example 1: Student A asks student B: “Can you show me how to change the size of the symbols on my plot?” This type of collaboration is allowed and encouraged.

Example 2: Student A asks student B: “Can I get a copy of your spreadsheet so that I can check my answers?” This type of collaboration is not allowed.

Example 3: Student A asks student B: “What formula did you use to answer Question 2 on the lab report?” This type of collaboration is not allowed. This type of question should be discussed with the teaching assistant or the instructor.

If you have questions about what is or is not allowed, contact the instructor or teaching assistant.

In grading the assignments and lab reports, the instructors will be looking for evidence of improper collaboration. If such evidence is found, all parties involved will receive no credit for the assignment. These principles also apply to the use of graded lab reports from previous semesters or from other courses. **You will receive no credit if it is determined that the work you turn in is not your own.**
College of Liberal Arts and Sciences Policies*

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at http://clas.uiowa.edu/students/handbook.

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (Operations Manual, III.15.2. Scroll down to k.11.)

Accommodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor privately to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Honesty

All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student’s responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Academic Policies Handbook

Chemistry DEO: James Gloer, E331 CB, 335-1350

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.
Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety web site.

*These CLAS policy and procedural statements have been summarized from the web pages of the College of Liberal Arts and Sciences and The University of Iowa Operations Manual.