CHEM:2021 Fundamentals of Chemical Measurements
Spring 2023

Instructor: Professor Max Lei Geng
W176 CB
Phone: (319)335-3167
E-mail: Lei-Geng@uiowa.edu

Office Hours: 12:30 pm – 2:00 pm, T (W176 CB)
5:00 pm – 6:30 pm, Th (W176 CB)
or by appointment

Lectures: 8:30 – 9:20 am, TTh, W228 CB
Labs: Section 0A01: 9:30 am – 12:20 pm  TTh E440 CB
       Section 0A03: 2:00 pm – 4:50 pm  TTh E440 CB

Textbooks: Quantitative Chemical Analysis, 10th edition (2020); Daniel C. Harris and
Charles A. Lucy, W. H. Freeman & Co.
Laboratory manual provided on ICON.

Course Web Site: http://icon.uiowa.edu; CHEM:2021:0AAA Spr23 Fundamentals of
Chemical Measurements
Course syllabus, schedule, lecture notes, announcements, answer keys to assignments
and exams, and grades are posted on the course ICON site. The entire laboratory manual
is available on the course web site.

Course Objective:
The objective of this course is to build the foundation for making chemical measurements
in the laboratory. The course will emphasize measurement theory, practical laboratory
skills and laboratory safety. Course topics include volumetric analysis, spectrophotometry,
chromatographic separations, mass spectrometry, standardization, calibration, error
analysis, hypothesis testing, modeling, graphical representation and discussion of results.

Basic Schedule:
The course is divided into lecture and laboratory sections. Lectures will cover basic
principles of the experiments and the associated data analysis. The laboratory will provide
the practical setting for conducting the experiments and building laboratory skills. Initial
course materials 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 and experiments.
Policy on Class Attendance:

Students are required to attend and arrive promptly for each laboratory session. Arriving late to laboratory sessions will result in deduction in lab performance scores. Attendance of lectures is strongly encouraged.

In the case of an excusable absence (e.g. illness, mandatory religious obligation, certain University activities, or unavoidable circumstances), a completed Absence Explanation Form form must be provided to the instructor in advance of foreseeable absences or within 72 hours of unforeseeable absences.

Missed laboratory sessions or exams can be made up only if the absence is excused. Lab reports for make-up laboratories will be due one week from the date the make-up lab is completed.

Grading:

The final grades in the course will be based on 10 laboratory experiments, spreadsheet tutorial and assignment, and two exams. The course components are scored as follows:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spreadsheet tutorial</td>
<td>40</td>
</tr>
<tr>
<td>1</td>
<td>Spreadsheet assignment</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Safety training</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>Prelab and notebook preparation (2 points each)</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>Data recording (2 points each)</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>Laboratory performance (10 points each)</td>
<td>100</td>
</tr>
<tr>
<td>9</td>
<td>Lab reports (100 points each, lowest score dropped)</td>
<td>900</td>
</tr>
<tr>
<td>2</td>
<td>Examinations (150 points each)</td>
<td>300</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1500</strong></td>
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Final Grade Assignment:

The course grades will be assigned according to the following grading scales.

- **A range**: 90-100%
- **B range**: 80-90%
- **C range**: 70-80%
- **D range**: 60-70%
- **F range**: < 60%

The lower limits for letter grades may be adjusted, but will never be raised. For example, the A range for final grades may be 88-100%, but will not be 95-100%. Plus/minus grades will be assigned.
A student must turn in eight or more laboratory reports in order to pass the course. Submission of fewer than eight lab reports will automatically result in a failure in the course.

Late Submission of Assignments:
Assignments are due at 11:59 p.m. on the specified due date. Deductions will be made in grading late assignments for **10 points per calendar day** after this deadline.

Examinations:
The exams will focus on materials presented in both the lecture and laboratory portions of the course. Exams 1 and 2 will focus on Experiments 1-4 and 5-10, respectively. Each exam will be cumulative relative to the statistics and data analysis materials presented in the lecture portion of the course.

Regrading:
Adjustments to grades will only be considered within one week after an assignment or exam is returned. The re-grade request must be made to Prof. Geng and accompanied by a written, detailed description of the grading concern using Regrade Request Form on ICON. Regrading will involve re-assessment of the entire assignment and may increase or decrease the grade.

Laboratory Performance:
Learning how to make chemical measurements is a central component of this laboratory course. Points are assigned to each experiment to assess the laboratory performance including observation of laboratory safety, timeliness, laboratory skills, proper cleanup, and appropriate handling of chemicals and wastes.

Laboratory Notebooks:
Each student must maintain a laboratory notebook. Specific instructions for keeping notebooks will be discussed in class and provided on ICON. Points in the class grade are allocated for the completion of the notebook entries.

Lab Reports:
A lab report must be completed and turned in for each experiment. Required report contents are detailed at the end of each experiment information package. Reports must be prepared using the Microsoft Excel templates provided. All reports must be submitted via the ICON assignments. It is the student’s responsibility to ensure that your completed assignments are successfully submitted on time; this may be done through an email confirmation from ICON.

Laboratory Safety:
Safety is a primary concern in chemistry laboratories and you will be expected to act in a safe and professional manner. Laboratory safety practices will be discussed in detail in lectures and safety guidelines are provided on course ICON site. 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 shorts are not allowed in the lab.
Computer Usage:
Each student will have access to computers in the departmental computer facility located in W241 CB for the entire semester. Computers will also be available in the laboratory where the experiments are conducted (E440 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.

Accommodations for Disabilities:
Please inform me if you have a disability which requires seating modifications, testing accommodations or accommodations of other class requirements, and we will make appropriate arrangements for you. Please contact me as soon as possible.

Policy on Plagiarism:
All work performed in this course is expected to be your own. Some laboratory experiments will be performed in groups. However, once you leave the laboratory, no collaborative work is permitted. If you have questions regarding an experiment, see the instructor or the TAs for help. We encourage you to discuss course materials with each other, but all submitted assignments should be completely your own work. In grading the assignments and lab reports, the instructors will be looking for evidence of collusion. 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 years.

You will receive no credit if it is determined that the work you turn in is not your own. For College of Liberal Arts and Sciences policies, see the CLAS Code of Academic Honesty in the Academic Policies Handbook: http://clas.uiowa.edu/students/handbook/academic-fraud-honor-code.

Department of Chemistry Administrative Details:

<table>
<thead>
<tr>
<th>Department of Chemistry Office</th>
<th>Professor Len MacGillivray, Departmental Executive Officer</th>
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<tbody>
<tr>
<td>Chemistry Building E331</td>
<td>(319) 335-1350</td>
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<table>
<thead>
<tr>
<th>Chemistry Center</th>
<th>Chemistry Building E225</th>
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<tr>
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<td>(319) 335-1341</td>
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College of Liberal Arts and Sciences
Information for Undergraduates

Absences and Attendance
Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, including Holy Day obligations, unavoidable circumstances, or University authorized activities (https://clas.uiowa.edu/students/handbook/attendance-absences). Students may use this absence form to aid communication; the instructor will decide if the absence is excused or unexcused (https://clas.uiowa.edu/sites/default/files/ABSENCE%20EXPLANATION%20FORM2019.pdf).

Academic Integrity
All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College’s Code of Academic Honesty. Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through the UI email address (https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code).

Accommodations for Disabilities
UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussing specific accommodations with the instructor. More information is at https://sds.studentlife.uiowa.edu/.

Administrative Home of the Course
The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and related policies. Other colleges may have different policies. CLAS policies may be found here: https://clas.uiowa.edu/students/handbook.

Communication and the Required Use of UI Email
Students are responsible for official correspondences sent to the UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2).
Complaints
Students with a complaint about an academic issue should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to the College of Liberal Arts and Sciences. For more information, see https://clas.uiowa.edu/students/handbook/student-rights-responsibilities.

Final Examination Policies
The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this information. No exams of any kind are allowed the week before finals. Visit https://registrar.uiowa.edu/final-examination-scheduling-policies.

Nondiscrimination in the Classroom
UI is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (diversity.uiowa.edu).

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 must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see https://osmrc.uiowa.edu/.