In this course, students will combine their existing expertise in quantitative chemical analysis and theoretical understanding of instrumental analyses to conduct a series of instrumental laboratory procedures. In these procedures, students will work independently or in small groups to learn how to prepare chemical samples, refine and conduct instrumental analyses, complete rigorous statistical analysis of data, formulate results, and create clearly presented outcomes in charts, tables, and written reports. The instrumental methods will include electrochemistry, spectroscopy, and separations.

Course Goals & Objectives: The goals are for students to learn characteristics, limitations, and proper implementation of instrumental
methods and techniques, and for students to sharpen their skills in data analysis and presentation of results.

Specific objectives include students:
1) Explain and Employ analytical and instrumental approaches
2) Choose and Demonstrate a preferred analysis approach for a given task
3) Apply or Develop proper data processing and manipulation methods
4) Interpret and Describe qualitative and quantitative aspects of data
5) Create and Evaluate experimental results using accurate, clear, and meaningful figures and written reports

Safety: All students are required to score 100% on prescribed safety quizzes before beginning associated experiments. In addition, students must:
1) wear safety goggles at all times while in the chemistry laboratory.
2) not wear open-toed shoes or shoes with perforations.
3) adequately cover their skin. If shorts, short dresses, or short skirts are worn, students must change into (student provided) alternative clothing before entering the laboratory.
4) Immediately report any injury to TA or instructor.
5) not eat, drink, or have any food products in the laboratory.
6) dispose of all chemicals, sharps, and other waste safely as directed by the laboratory procedure, TA, and instructor.
7) Heed instructions of course all TAs and instructors
8) Follow all general lab safety practices
Any student who fails to comply with safety standards will be removed from the lab.

Course Materials:

Course Website Course materials will be posted on the CHEM:3430:AAA ICON site. Log in with your hawkid and password at: https://icon.uiowa.edu/

Course Texts: The textbook for this course will be Harris, Quantitative Chemical Analysis. 8th Edition, W.H. Freeman and Company. Additional books may be on reserve at the chemistry library as necessary. Students will also be expected to access primary literature material.

Laboratory Notebook: Students are responsible for purchasing an approved laboratory notebook before the first lab period, and for bringing their notebook to every laboratory period.

Laboratory Manual: The laboratory manual will be made available in digital format via the course ICON website. Students are responsible for bringing a copy of the manual to lab.
**Computer Facilities:** The Chemistry Department computer facilities in W238 and W241 CB will be available for course related activities with your university ID card during regular building hours. These rooms have multiple computers with access to University software as well as digital scanners to create digital files.

**Grading:** The primary metric for this course will be the student’s ability to communicate their mastery of the course goals and objectives in a safe, responsible, and professional manner. This will be assessed through quizzes, homework, exams, written reports, and active participation in course activities. This course will use the +/- system of letter grades. Relative values of course assessments are provided here:

<table>
<thead>
<tr>
<th>Assessment Mechanism</th>
<th>Fraction of Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Reports</td>
<td>65%</td>
</tr>
<tr>
<td>Pre-Lab Exercises and Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Laboratory Practical</td>
<td>10%</td>
</tr>
<tr>
<td>Laboratory Notebook</td>
<td>5%</td>
</tr>
<tr>
<td>Participation and Citizenship</td>
<td>5%</td>
</tr>
<tr>
<td>Homework</td>
<td>0%</td>
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</tbody>
</table>

**Detailed Assessment Information:**

**Laboratory Reports:** Reports will be due at 9:30 a.m. on the seventh day after the laboratory procedure is completed. Each student is responsible for submitting original, independent reports to the appropriate ICON dropbox for every laboratory experiment. Reports must be typed on a word processor. All text and data must be combined into a single .pdf file for upload to ICON. See the “Laboratory Report Guidelines” document for additional information.

**Pre-Lab Exercise and Quiz:** Each procedure will have an associated pre-lab exercise, video, and quiz. The exercise and quiz must be submitted to ICON at least 24 hours before you begin related laboratory work. Students will not be allowed to enter the laboratory if the quiz and exercise are not completed successfully on time.

**Laboratory Practical:** Near the end of the semester, each student will be assigned an individual, practical task to be completed and reported in a single laboratory period. Laboratory time will be assigned to allow the student to prepare a sample and create a data set. Additional time in a computer lab will follow immediately to analyze data and create a short (<2 page) report describing the outcome. Laboratory practicals will be evaluated with respect to a student’s ability to:

1. identify and utilize necessary information  
2. develop an appropriate analytical method
3. conduct an accurate and precise chemical analysis
4. accurately interpret and evaluate experimental data
5. present results in graphics and/or charts
6. determine and clearly report conclusions supported by evidence

Lab Notebooks: Be sure to clearly label your lab book cover and pages with dates, your name, and experiment/course details. For each procedure, include the objective(s), notes on sample prep and data acquisition procedures, relevant variables and parameters, and clear lists of any associated digital content (file names, file locations, and extensions). Lab notebooks must include a table of contents. Lab notebooks will be spot checked throughout the semester by the course director and TAs.

Citizenship and Participation:

- On-time attendance is required and will be evaluated. Circumstances may arise that cause some students to be absent or late. In these instances, the course director reserves the right to request documentation and contact information to verify and excuse the absence (see make-up labs).

- Students that arrive late or unprepared to commence work at the beginning of a lab period will be turned away (see pre-lab exercises).

- Being a good lab citizen and co-worker is a vital for success. All students are expected to treat each other, the instructors, staff, and laboratory equipment with respect. This will be evaluated by the course director and TAs.

- The course director may identify out-of-class seminars, lectures, or other appropriate activities in which students might participate for additional citizenship and participation points.

Homework: Students are encouraged to work collaboratively on homework, following the assignment schedule as posted. Homework will not be scored, but TA’s will be available to discuss the problems.

Re-Grading: A student may request re-grading of any assessment within 48 hours of the time the original grading decision is presented. Such requests must be accompanied by a written justification for the re-grade request. Note that a re-grade request initiates review of the entire assessment and may raise or lower the ultimate score.

Late work:
- Pre-lab quizzes and exercises will not be accepted late. Failure to complete any portion of the prelab on time will result in a missed
lab and no credit. Labs missed due to unexcused late work are not eligible for make-up.

- Late lab reports will immediately lose 25% of available points. Reports received more than 48 hours late will receive zero credit.

**Make-up Labs:** Students may request an excused absence by submitting a “Lab Make-Up Request” form via email to Prof. Shaw no later than 48 hours after the missed lab period. If a student is excused from a lab period based on illness or another qualifying reason, the instructor may choose to arrange a make-up laboratory period or other suitable arrangement.

**Incomplete Laboratory Procedures:**

Students who fail to complete a procedure or fail to obtain their own useable data set should immediately consult with the TA in charge for advice on the best course of action. The two most common options are:

1. At the instructor’s discretion, an alternate data set for the procedure may be provided to the student. Depending on circumstances, this may result in a deduction of up to 50% of total points possible from the final lab report score.

2. Alternatively, a student may choose to complete the report using their own errant data set. In this case, the student must clearly address these additional points in their report:

   - Explain what happened: how things went wrong and what corrective actions were taken (if any) and what would have been the correct course of action
   - Detailed all implications the incomplete/errant data set(s) have on the data analysis and conclusions
   - Demonstrate completion of all questions and analysis components requested for the full report. Specifically, even if the lack of data inhibits a calculation, the student should show detailed, sample calculations that prove (s)he would be have been successful with a full data set

**Laboratory Equipment Policy**

1) All glassware and other equipment received by a student at the beginning of the semester or lab period is the responsibility of that student.

2) On the day/time of check-in, the student must insure that all the equipment required 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.
3) At the end of the day/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.
4) All pieces of glassware or equipment missing, broken, or not in good working order that was in the student’s possession must be replaced and could be charged to the student’s account through the University billing system.

**Academic Integrity:**

Students are expected to follow the University's Code of Student Life which includes exhibiting the utmost respect for academic honesty; anything less will result in severe consequences. If you are unsure of the definition of academic dishonesty, please visit [http://clas.uiowa.edu/students/handbook](http://clas.uiowa.edu/students/handbook), or specifically, [http://clas.uiowa.edu/students/handbook/academic-fraud-honor-code](http://clas.uiowa.edu/students/handbook/academic-fraud-honor-code) for a full statement on the subject.

Plagiarism and its detection will receive special levels of attention in this course. All materials turned in for credit are expected to be original work of an individual student. In some experiments students will work in groups to collect data, but analysis, figures, and reports must be prepared individually. No collaborative work is permitted on lab reports after the conclusion of the experimental procedure. Plagiarism will result in zero credit and referral of all parties for punitive action.

**General Course Practices:**

Students and course directors have a shared responsibility to create an environment conducive to learning and professional growth. As such, all class participants will be expected to exhibit the utmost degree of courtesy and professionalism at all times. With this in mind:

1) the use of mobile/cellular phones is prohibited
2) the use of laptop computers, tablets, i-pads, etc. during class is a privilege that will be allowed contingent on the condition that these devices are used exclusively for facilitating in-class activities. The course director reserves the right to revoke this privilege at any time and to remove any student from the class who abuses this privilege
3) electronic correspondence must be carried out via official UIOWA email addresses. Messages, replies, or forwards from non-official addresses cannot be considered viable for security reasons
4) all homework and other assignments must be uploaded as a single .pdf file to the appropriate ICON drop box

Finally, be aware that video and audio may be recorded during this class for the purposes of improving future course offerings. If this makes you
uncomfortable, or you wish not to be recorded, you may request to be excluded from the recordings.

**Resources for Students:**

Students may find the Campus Writing Center very useful for this course. The Tutor Iowa site is also very valuable for students seeking extra help:

- Writing Center: [http://www.uiowa.edu/~writingc/](http://www.uiowa.edu/~writingc/)
- Tutor Iowa: [http://tutor.uiowa.edu/](http://tutor.uiowa.edu/)

**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.

**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 correspondence ([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 to make particular arrangements. See [www.uiowa.edu/~sds/](http://www.uiowa.edu/~sds/) for more information.

**Academic Honesty** All students taking CLAS courses have, in essence, agreed to the College's [Code of Academic Honesty](http): "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 date and time of every final examination is announced by the Registrar generally by the tenth day of classes. 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. It is the student's responsibility to know the date, time, and place of the final exam.

**Making a Suggestion or a Complaint** Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident ([CLAS Academic Policies Handbook](#)).
**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 *Public Safety website*. 