CHEM:3430 – Analytical Measurements
Course Syllabus

Instructor: Prof. Scott K. Shaw
Office: W476 CB or https://uiowa.zoom.us/j/3193841355
Hours: Mondays, 8:30 to 10:30 a.m.
Email: scott-k-shaw@uiowa.edu
DEO: Prof. Len MacGillivray, E331 CB, phone 335-1350

Teaching Assistants:

<table>
<thead>
<tr>
<th>Name / Email</th>
<th>Office Hours (E208 CB)</th>
<th>Grader for:</th>
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<tbody>
<tr>
<td>Collin Hill</td>
<td>Tuesday 9:30 – 10:30</td>
<td>Plots/Fits, HPLC, Homework, Safety Exams</td>
</tr>
<tr>
<td><a href="mailto:collin-hill-1@uiowa.edu">collin-hill-1@uiowa.edu</a></td>
<td>Thursday 11:30-12:30</td>
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<tr>
<td>Hong Bok Lee</td>
<td>Mondays and Wednesdays 4:30 – 5:30 PM</td>
<td>UV-Vis, Fluorescence, GC lab</td>
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<tr>
<td><a href="mailto:hongbok-lee@uiowa.edu">hongbok-lee@uiowa.edu</a></td>
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<tr>
<td>Chamini Perera</td>
<td>Tuesdays and Thursdays 2:30-3:30</td>
<td>Circuits Lab, FTIR, CE</td>
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<td><a href="mailto:chamini-perera@uiowa.edu">chamini-perera@uiowa.edu</a></td>
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<tr>
<td>Michael Van Den Top</td>
<td>Wednesday 12:30-1:30 PM and 4:30 to 5:30 PM</td>
<td>CV, ICP/AES</td>
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<tr>
<td><a href="mailto:michael-vandentop@uiowa.edu">michael-vandentop@uiowa.edu</a></td>
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Lecture: All - 8:00-9:15 Tue/Thurs, C29 Pomerantz Center

Laboratory: A01 - 2:00-4:50 Tue/Thurs, W428 CB
A02 - 9:30-12:20 Tue/Thurs, W428 CB
A03 - 1:30-4:20 Mon/Wed, W428 CB
Computer Labs: W238/W241 CB

Course Description: 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 the preferred analysis for a given task
3) Apply or Develop proper data processing and manipulation methods
4) Interpret and Describe data qualitatively and quantitatively
5) Evaluate and Communicate experimental results using accurate, clear, and meaningful figures, text, and presentations.

Safety: Students are required to score 100% on prescribed safety quizzes before beginning associated lab procedures. 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:

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<thead>
<tr>
<th>Assessment Mechanism</th>
<th>Fraction of Course Grade</th>
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<tr>
<td>Laboratory Reports</td>
<td>70%</td>
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<tr>
<td>Pre-Lab Exercises and Quizzes</td>
<td>15%</td>
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<tr>
<td>Laboratory Practical</td>
<td>5%</td>
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<tr>
<td>Laboratory Notebook</td>
<td>5%</td>
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<tr>
<td>Participation and Citizenship</td>
<td>5%</td>
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<tr>
<td>Homework</td>
<td>0%</td>
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Detailed Assessment Information:

Laboratory Reports: All laboratory reports (written or otherwise) will be due at 11:30 p.m. on the sixth day after the laboratory procedure is completed. Each student is responsible for submitting original and independent material to the appropriate ICON dropbox for every laboratory procedure as detailed in the respective assignments. All text, data, calculations, graphics, or other content should be combined into a single .pdf file for upload to ICON. Video files should be in .M4V or .M3U format. See the “Laboratory Report Guidelines” appendix or 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 receive an automatic 25% point reduction 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 the “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 created by TAs may be provided to the student(s). 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/incomplete data set. In this case, the student must clearly address these additional points in their report:
   - Explain what happened: how things went wrong, 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

- This pathway offers an opportunity for full credit despite poor data

**Laboratory Equipment Policy**

1) All glassware and other equipment used by a student is the responsibility of that student. We expect some breakage and wear. Excessive breakage or wear will result in penalties.

2) On the day/time of check-in, the student must ensure that all the equipment required is in the drawer, the glassware and 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, 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 in lecture and lab
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 assignments must be combined into a single file and uploaded to the appropriate ICON drop box. The .pdf format should be used wherever possible.

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/
Tutor Iowa: http://tutor.uiowa.edu/

**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 course absence policies, which 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, and University authorized activities

(https://clas.uiowa.edu/students/handbook/attendance-absences). Students may use the CLAS absence form to aid communication with the
instructor who will decide if the absence is excused or unexcused; the form is located on ICON within the top banner under “Student Tools.”

**Academic Integrity:** All undergraduates enrolled in courses offered by CLAS have in essence agreed to the College’s [Code of Academic Honesty](https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code). Academic misconduct affects a student’s related grade and is reported to the College which applies an additional sanction including suspension. Outcomes about misconduct are communicated through UI email.

**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 a mental health, attention, learning, vision, and a 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/](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 UI colleges may have different policies for courses offered by that college. CLAS policies may be found here: [https://clas.uiowa.edu/students/handbook](https://clas.uiowa.edu/students/handbook).

**Classroom Expectations:** Students are expected to comply with University policies regarding appropriate classroom behavior as outlined in the Code of Student Life ([https://dos.uiowa.edu/policies/code-of-student-life/](https://dos.uiowa.edu/policies/code-of-student-life/)). This includes related UI policies and procedures that all students have agreed to regarding the COVID-19 pandemic. Particularly, each student must wear a face mask when in a UI building, including a classroom. The density of seats in classrooms has been reduced, and in some instances, this will allow 6 feet or more of distance while other cases, it may be less. Regardless, wearing a face mask and maintaining as much distance as is possible are vital to slowing the spread of COVID-19. In the event that a student disrupts the classroom environment through the failure to comply with a reasonable directive of an instructor or of the University, the instructor has the authority to ask that the student to leave the space immediately for the remainder of the class period. Additionally, the instructor is asked to report the incident to the UI Office of Student Accountability, with the possibility of additional follow-up with the student. Students who need temporary alternative learning arrangements (TALA) for a future semester related to COVID-19 should visit this website for more

**Class Recordings: Privacy and Sharing:** Some sessions of a course could be recorded or live-streamed. Such a recording or streaming will only be available to students registered for the course. These recordings are the intellectual property of the faculty, and they may not be shared or reproduced without the explicit written consent of the faculty member. Students may not share these sessions with those who are not enrolled in the course; likewise, students may not upload recordings to any other online environment. Doing so is a breach of the Code of Student Conduct and in some cases is a violation of the Federal Education Rights and Privacy Act (FERPA).

**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 or with 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. See this page for more information: 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 with a few exceptions made for particular types of courses such as labs or off-cycle courses:


**Nondiscrimination in the Classroom:** The University of Iowa is committed to making the classroom a respectful and inclusive space for people of all gender, sexual, racial, religious, and other identities. Toward this goal, students are invited in MyUI to optionally share the names and pronouns they would like their instructors and advisors to use to address them. 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

https://diversity.uiowa.edu/eod; +1319335-0705
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/.