Chem 219 Syllabus

Course objectives

This lab course gives a practical introduction to instrumental methods of analysis - that is, the measurement of chemical systems using instruments.

This lab has been developed to provide students with hands-on experience with modern methods of instrumental analysis. As such, although not formally a pre-requisite for this lab, Chem 221 (Instrumental Analysis) should have been taken previously. Specifically, the objectives of this course are to initiate the students in the theory, operation and uses of

- Fundamental concepts in instrumental electronics and data acquisition
- Practical usage of instrumentation for spectroscopic, chromatographic, and mass spectrometric analysis
- Calibration/quantification procedures for analysis of a variety of materials
- Preparation of written and oral reports with basic statistical analysis.

The students will also develop an understanding of the types of samples amenable to each instrument and the kind of information attainable. Specifically, we will discuss

- the chemical and/or physical principles exploited during the measurement
- how the instrument actually makes the measurement, and
- some of the techniques used to improve the analytical figures of merit, such as accuracy, precision and sensitivity.

Instructor

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Office Hours

I will establish and announce office hours for the semester during the first week of classes. I will be available at other times as well (see me to make an appointment) and, of course, you are welcome to stop by my office at your convenience (but, if I am busy we will have to reschedule for another time). Also, I am *virtually* available via email for your questions; I check my email regularly every day (even on weekends), so you should be able to get an email reply to a question within 12 hours of your posting it to me (barring any unforeseen technical difficulties!).

Course Logistics

Attendance at lab is mandatory. If you have a conflict with a lab, please notify your TA before the lab so we can resolve the problem. If you have to miss a lab due to illness or other emergency, please let me know within 24 hours. Unfortunately, labs cannot be re-scheduled.

Meeting time: Lab nominally meets on Thursdays, 8:30am – 12:30pm in W407 Discovery

Evaluation: Since these are NOT simple, well established labs with standard report sheets, the evaluation for each lab will be flexible. There will be no lab final, and I will not be collecting lab notebooks regularly to see what you have recorded in them, but I will collect notebooks from select groups during the semester. As part of the writing intensive part of this class, be prepared to do four formal written lab reports. I will give you the format for these reports the first day of labs. There is also the *likely* possibility that I may weekly assign one group to write a 'Lab manual' or 'Instrument Cookbook' for the use of the given instrument. Each lab will be worth 100 points.

Grading: 90-100 A; 80-89.999 B; 70-79.999 C; 60-69.999 D.

Please note that grades may be adjusted up at the end of the semester, depending on how things go. In no case will grades be adjusted down.

Inclusion: It is my intention to create an inclusive environment, with a diverse range of opinions and perspectives. If you ever find that is not the case, I hope you will set up a time with me to discuss the problem.

COVID-19 Considerations

In order to both ensure the safety of everyone in this class as well as meet the learning objectives of this laboratory course, we've made a number of changes to the course structure and operation this semester. Our laboratory rooms have been carefully marked so as to maintain physical distancing both at the lab benches as well as near shared facilities (e.g., balances, fume hoods, sinks, etc.). Reducing lab densities requires that only *half* of the usual lab capacities be used and, whereas students would typically work in pairs, this semester each student will work by themselves.

This fall, more than ever, we need to make sure that our class behaves as a caring and safe community - we can only operate safely in the lab if we all are willing to work to ensure the health of everyone in our "community." In addition to the usual safety precautions taken while working in a chemistry lab in which hazardous substances are handled (e.g., safety goggles, gloves, etc.), we will also provide and require that you wear a disposable medical procedure mask while in the lab. Keeping our community safe also requires that we share information regarding our own health as it relates to working safely together in lab – so, prior to entering the lab, you will be asked to complete a check-in form (not unlike the daily check-in you make as part of the Green and Gold Promise with questions similar to those asked by some businesses prior to admission to their facilities). If you are not feeling well, have been exposed to someone who has tested positive for Covid-19 (or have, yourself, tested positive), travelled outside of the state within the past 14 days, etc. you should not be working in the lab. I have committed to weekly testing – just as you have – and should I not feel well or test positive or if I have been exposed to someone who has tested positive, I will not be with you in the lab until I can do so safely.

During our first laboratory meeting, you will be provided with information regarding safety in the chemistry laboratory, including specific precautions we have implemented this semester for minimizing the potential for exposure to Covid-19. I am confident that, with attention

to all of these safety protocols, we can have a safe and meaningful semester in and outside of the lab!