

Chemistry 250 (2 credit) Instrument Proficiency for Scientists - UV/Vis Spectroscopy Spring 2019

Operated as an Independent Study with times arranged

Instructor

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Office hours 2-3 pm M and by appointment

Class schedule

Work will be centered around the Shimadzu UV-2450 UV-Vis Spectrometer and accessories.

Wet lab work: 2-3 hours per week, specifically scheduled with the instructor to coordinate schedules and avoid conflicts for time on the instruments.

Permissible unscheduled work (not wet lab): computer, literature, writing reports.

Principal locations of course work: FSC 350 and FSC 312

Regular attendance is expected.

Work in groups of two is permitted and encouraged.

Supplies

Safety goggles (wear them consistently in lab work).

Permanently bound lab notebook with carbon/carbonless pages. It can be a continuation of a notebook used for another course.

Course description

Each offering enables students to develop a solid foundation in the theoretical aspects and operating principles, as well as develop hands-on proficiency in the operation of the featured instrument and interpretation of the data. UV-Vis Corequisite: Chem 202.

Student Outcomes

Students will be able to:

- For a C - acquire spectra on the UV spectrometer, choose a cuvette material, and associate a UV absorbance peak with a functional group.
- For a B - use acquired data to determine the molar absorptivity for a compound.
- For an A - acquire data from the spectrometer coupled with the Constant Temperature accessory and use that data for thermodynamic calculations.

Moodle

The syllabus and other handouts for this class will be posted on Moodle under **SP19 CHEM 250 A**. You are automatically enrolled when you register for this course. **Note:** GCMS Proficiency will be using the same Moodle course.

Make sure you use the **UV-Vis** Moodle drop boxes to submit electronic files and email the instructor when you make a submission. No paper copies are required except for the initial drafts of the Safety Reports and notebook pages.

- Insert the Honesty Pledge in one file for each submission set.
- Submit only one copy of each item per group, **don't double submit**. Suggestion: appoint a "submitter" for your group and have that person submit everything.
- Email the instructor when you have made a submission to Moodle.
- Files for an activity can be submitted as separate files (any number) or combined into one document.
- Submissions must be in one of these formats: Word, Excel, pdf, txt, jpg, or png.

COURSE POLICIES

Deadline

Submit reports and documentation of completed projects as you finish them; **don't** wait until the end of the term submit everything. Completion of all work and submission of reports is Friday, May 10. In place of a final exam, the class will meet at 2:00 pm on Wednesday, May 15, to share experiences. Come prepared to share/compare the results of your projects.

Grading

Criteria for grades of C, B, and A are outlined below. Plus/minus grades will be determined by the quality of the work submitted.

To earn a grade of C:

1. Each **person** maintain a current and satisfactory laboratory notebook. Turn in notebook carbon pages each week (on instructors desk).
2. Be present in lab each week.
3. Do UV-Vis Project for a C provided as a handout.

To earn a grade of B - requirements for a C, plus:

4. Explore the resources. In a four page paper (double spaced, 1" margins), summarize the key concepts in UV-Vis spectroscopy. Include in your discussion: a description of the absorption process, single beam vs. double beam instruments (design and operation), a brief description of how the Peltier device in the temperature controller works, and any other aspects you feel are appropriate. Submit an electronic copy of this report to Moodle (Word or pdf format) and email the instructor. This report must be submitted **before** you move to the exercises required for an A.
5. Do UV-Vis Project for a B provided as a handout.
6. Compile a list of corrections and suggested modifications for the UV-Vis operations manuals. Submit an electronic copy to Moodle following Moodle criteria above. The format of your list is not critical; your comments will be incorporated into a revision of the manual.

To earn an A - requirements for a C and a B, plus:

7. Do UV-Vis Project for an A provided as a handout.
8. Compile a list of corrections and suggested modifications for the Temperature Control operations manuals. Submit an electronic copy to Moodle following Moodle criteria above. The format of your list is not critical; your comments will be incorporated into a revision of the manual.

Resources (no texts to purchase)

Use these resources in place. **Do not remove them except briefly (half hour or less) to make copies in Mikkelsen Library!**

1. Instrument manuals for the UV-Vis.
2. Ronald C. Denny and Roy Sinclair, *Visible and Ultraviolet Spectroscopy*, Analytical Chemistry by Open Learning, John Wiley, New York, 1987. (QD96 .A2 D47 1987 - FSC 312 Computer Lab).
3. Dr. Weisshaar's Courses Home Page at URL <http://faculty.augie.edu/~dew> and associated links.
4. Analytical Sciences Digital Library <http://asdlb.org/> - a peer-reviewed digital library for the analytical sciences.
5. *J. Chem. Ed.* searchable index on the web at URL <http://data.jche.divched.org/~/cesearch/index.php> (link provided on the course web site).
6. Chemistry 311 materials in Computer Lab FSC 312.
 - a. Lab and Writing Resources - experimental procedures.
 - b. Articles on Instrumental Methods.
 - c. Analysis and Instrumental Methods texts and lab manuals.
7. Do your own search for others, include SciFinder. Share good links with your instructor.

UNIVERSITY POLICIES

Accessibility

Augustana welcomes students with disabilities to participate in all of its courses, programs, services, and activities. If you have a documented disability and are requesting accommodations, please contact Susan Bies, Director of Accessibility and Academic Support. Her office is located in the Student Success Center (Edith Mortenson Center, Suite 100) and she may be reached at 605-274-5503 or susan.bies@augie.edu.

Chemistry, by its very nature, involves handling of potentially hazardous substances. The labs in this course will teach you how to handle these substances properly while minimizing the range of exposure. However, exposure effects vary from person to person. So, if you have asthma, allergies, are pregnant, or have other special circumstances, please inform your lab instructor so we can plan appropriate accommodations for your safety.

Honor Code

As a community of scholars, the students and faculty at Augustana University commit to the highest standards of excellence by mutually embracing an Honor Code. The Honor Code requires that examinations and selected assignments contain the following pledge statement which students are expected to sign:

“On my honor, I pledge that I have upheld the Honor Code, and that the work I have done on this assignment has been honest, and that the work of others in this class has, to the best of my knowledge, been honest as well.”

Faculty members are responsible for investigating all instances involving any student who does not sign the Honor Pledge or who bring forward an academic integrity concern. The complete Honor Code can be found at www.augie.edu/honor.

What does this mean in this course?

- ▶ You do your own work on individual assignments (not copying others). On group assignments you contribute to the group effort and strive to understand all parts of the project, not just the part you do.
- ▶ In lab you are “true” to your data - your report reflects what *you* measured and observed; data is not changed or manufactured to fit expectations. If you missed collecting some data, see the instructor; don’t copy someone else’s data.
- ▶ Give credit where credit is due. When you gather data from the Web, books, magazines, etc. cite the reference (author, title, etc.).

I presume we are in this class to help each other learn some chemistry (yes, instructors learn in this class too), so I trust you to turn in work that reflects your efforts and also, that as individuals and in your small groups, to help each other adhere to the **Honor Code**. The above statement *should be added to one file in each submission set*.

If you cannot, in good conscience, sign this pledge or if you have other concerns about academic integrity in this course, please come visit with me (in confidence of course) or send me an e-mail note. At a minimum, students caught violating this code will receive a zero (0) on the assignment or exam and the incident will be reported to the Academic Dean in accordance with the **Honor Code** procedures.

Turnitin

Turnitin is an originality detection service. Its use in this class is both to prevent plagiarism and to help the student improve his or her writing. Turnitin.com compares a document with its extensive database of submitted papers, published works, and documents from the internet. Turnitin issues a “similarity score.” Your instructor will review the similarity report and make any determinations about any improper citations, missing citations, or plagiarism. Student papers will be retained in the global Turnitin repository for future comparisons.

Commitment to Diversity

Augustana University is committed to creating and fostering a learning and working environment based on open communication and mutual respect. This is an integral part of the academic mission to enrich our students' educational experiences and prepare them to live in and contribute to a global society. If you encounter sexual harassment, sexual misconduct, sexual assault, or discrimination please contact the Title IX Coordinator at 605-274-4044 or belam@augie.edu. If you make a report of this nature to a faculty member, they must notify the Title IX Coordinator about the basic facts of the incident (you may choose whether you or anyone involved is identified by name). For more information about options at Augustana, please visit www.augie.edu/titleix.