Intended Student Learning Outcomes:

Successful students in this course will:

- Be able to study chemical problems by using modern instrumentation correctly and through understanding the numerical significance of the experimental results.
- Be able to write a scientific paper or report of sufficient organizational and writing quality to be accepted in a peer-reviewed scientific journal.
- Act as a scientific collaborator by assisting a peer in revising his or her writing and organization of a manuscript.
- Design and conduct a research project safely.

Instructional Methods:

Lecture sections held once a week (via Zoom) describe theoretical and practical aspects of modern chemistry experimentation emphasizing aspects of chemistry across the discipline. Lectures also instruct students on the writing of clear, concise laboratory reports in various styles culminating with preparation of manuscripts appropriate for publication in journal articles.

The laboratory section meets twice weekly and provides time to perform the experiments along with hands-on instruction in experimental methods. Students perform a total of six laboratory experiments (two-to-three-week duration) during the semester. The last laboratory experiment involves students developing their own final project. This project is typically an extension of one of the experiments from earlier in the class but could be any project of proper level and scope.

Course Calendar and Laboratory Schedule:

Wk	Dates	LabName	Topic / Technique
1	24, 25 Aug	COVID-procedures and instruction on safety, notebooks, figures, writing	Safe practices
2	31 Aug, 4 Sep	Exp 1: Spectrophotometric titration	UV/Vis, software, equilibrium, pH
3	8 Sep *	Continue Exp 1, work on presentation skills	
4	14, 15 Sep	Exp 2: Kinetic analysis of competing reaction mechanisms	Kinetics, Spectroscopy / UV-Vis
5	21, 22 Sep	Finish Exp 2	
6	28, 29 Sep	Exp 3: Inhibition of enzymes	Synthesis, enzyme assays
7	5, 6 Oct	Continue Exp 3	
8	12, 13 Oct	Finish Exp 3	
9	19, 20 Oct	Exp 4: Fluorescent polymer synthesis	Emission spectroscopy
10	26, 27 Oct	Finish Exp 4	

11	2, 3 Nov	Exp 5: Analysis of organics in snow	Extraction, organic analysis

The report for Exp 1 involves writing a short section of a manuscript that is submitted to the professor in a "draft form", commented upon by the professor, returned, revised by the student, and re-submitted in a final form. Grading is based upon the draft, the attention to detail in revision, and the final form.

Students write full laboratory reports for four experiments they perform (experiments 2-5). The first laboratory reports are written in the style of internal reports used in industry. These reports hone organizational and writing skills. Later reports consist of complete journal-style articles, readable by those not intimately familiar with the techniques used in the experiments. The Exp 2 report undergoes a draft, revision, final submission cycle just like Exp 1. The Exp 3 and 4 reports are handed in to both the professor and to another student in the class acting as a “collaborator”. The collaborating student will then comment upon the draft and will submit this information to both the professor and the writer. The writer then has a chance to revise the report for final submission. The "collaborator" is graded upon the quality of their review.

This is a senior-level "capstone" course. Therefore, all students will take a chemistry major exit examination to assess the overall quality of his or her education in chemistry and our program's effectiveness in teaching. We will be using the American Chemical Society (ACS) Diagnostic of Undergraduate Chemical Knowledge (DUCK) examination. Details of taking the examination will be given in class. Your examination score will be converted on a curved scale to give 10% of your grade in this course. The examination will be given late in the Fall semester.

Students

The grading scale is listed below, using letter grades without +/- grading. I reserve the right to adjust these percentages (only in the favor of the student --

members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/.

Amending this Syllabus:

Amendments and changes to the syllabus, including evaluation and grading mechanisms, are possible. The instructor must initiate any changes. Changes to the grading and evaluation scheme can be made before the add/drop date without a vote, but after that date must be voted on by the entire class and approved only with unanimous vote of all students present in class on the day the issue is decided. The lecture schedule and reading assignments (the daily schedule) will not require a vote and may be altered at the instructor's discretion. This daily schedule will be communicated via Blackboard. Grading changes that unilaterally and equitably improve all students' grades will not require a vote. Once approved, amendments will be distributed in writing to all students via Blackboard.

Class web page:

Our webpage is on the blackboard system, at https://classes.alaska.edu/.

Important dates:

4 Sep 2020 – Last day for student- and faculty-initiated drops with refund (course does not appear on academic record).
7 Sep 2020 – Labor day holiday (no class)
30 Oct 2020 – Last day for student- and faculty-initiated withdrawals (W grade appears on academic transcript)
25-29 Nov 2020 – Thanksgiving holiday
5 Dec 2020 – Last day of instruction
9 Dec 2020, 11:15 a.m. - 2:15 p.m. – Final Examination (Oral presentations of project results)