San José State University
Department of Chemistry
Physical-Inorganic Techniques, CHEM 146, Spring, 2021

Instructor:	Prof. Madalyn Radlauer
Office Location:	DH 517
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Email:	madalyn.radlauer@sjsu.edu *(preferred means of contact)*
Office Hours:	Wednesdays 2:00 pm – 4:00 pm or by appointment All office hours will be held virtually via Zoom.
Class Days/Time:	Fridays On learn-from-home days: 9:00 am – 3:40 pm On lab days: 9:00 am – noon and 1:00 pm – 4:00 pm
Classroom:	Zoom and DH 010
Prerequisites:	CHEM 100W, CHEM 113A, CHEM 145 (with grades of "C" or better; "C-" not accepted) or instructor consent.

Course Website

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas (https://sjsu.instructure.com/). In addition, all assignments will be submitted via Canvas. You are responsible for regularly checking with the messaging system in Canvas to learn of any updates.

Course Description (from the course catalog)

Application of advanced instrumental and preparative techniques to the study of structure, reactivity and spectroscopy of inorganic and organic substances including materials. This is a capstone course. A grade of C or better is required for majors.

Course Goals and Learning Objectives

The goal of this course is to introduce physical and inorganic methodology, preparing students to understand and pursue related laboratory research. As a capstone course, this class will require students to integrate principles, theories, and methods learned in previous courses throughout the major. It will involve writing and presentations, building the students' ability to effectively communicate scientific data and ideas. To that end, I will provide feedback on each of your assignments and part of your success in the course will be measured by your ability to integrate that feedback into later assignments.

Program Learning Objectives (PLO)

CHEM 146 will address the following chemistry department program learning objectives (http://www.sjsu.edu/chemistry/Academic_Programs/Undergraduate_Programs/Undergraduate_Program_Learning_Objectives.html):

PLO #1 – Demonstrate understanding of core concepts, methods and limits of scientific investigation to effectively solve problems in inorganic chemistry.

PLO #4 – Demonstrate understanding of core concepts, methods and limits of scientific investigation to effectively solve problems in physical chemistry.

PLO #6 – Answer questions regarding safe practices in the laboratory and chemical safety.

PLO #7 – Demonstrate safe laboratory skills (including proper handling of materials and chemical waste) for particular laboratory experiments.

PLO #9 – Effectively present a scientific paper orally applying the scientific approach, as at an American Chemical Society symposium.

PLO #10 – Write a formal scientific laboratory report which applies the scientific approach to address a chemical problem and follows the format and style of an article in a peer-reviewed American Chemical Society journal.

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

CLO 1: Make predictions in a laboratory setting based on concepts from general, physical, analytical, and inorganic chemistry courses. (Pre-lab and proposal assignments)

CLO 2: Determine, execute, and troubleshoot synthetic and analytical experimental procedures found in the scientific literature safely and efficiently. (Pre-lab and in-lab assignments)

CLO 3: Evaluate and discuss the results of a project. (Write-up assignments)

CLO 4: Develop a short research proposal based on literature precedent, and persuade reviewers (the instructor and fellow classmates) of its merits through written and oral presentations. (Proposal assignments)

Texts/Readings

Textbook

No textbook is required for this course.

Other References (not required, these may provide further clarification of various topics)

Inorganic, physical, and analytical chemistry textbooks such as *Inorganic Chemistry* (https://www.pearsonhighered.com/miessler5einfo/) by Gary L. Miessler, Paul J. Fischer, and Donald A. Tarr (5th edition, 2014) ISBN: 9780321811059 may be useful for background information.

Primary literature will be essential for the projects in this course. You should have a student library account with the King Library that allows you access the library electronic databases (https://libguides.sjsu.edu/az.php) such as SciFinder (https://scifinder.cas.org/). If you plan to access the library services from off-campus, you may need to obtain a password and/or proxy to do so. Check the Library website for information.

Library Liaison

The reference Librarian for Chemistry is Yen Tran and her email is **yen.tran@sjsu.edu**.

Other Technology/Equipment/Material Requirements (more details in lab manual)

You will need a bound, lined laboratory notebook (a partly used notebook with at least 20 unused pages is acceptable); a calculator; lab glasses or goggles; and a lab coat. These are all needed for the first day in lab.

Course Requirements and Assignments

Graded work in this course will include Canvas discussion posts as well as assignments on three short in-lab projects and on one proposal. As the semester progresses you will get grades and feedback on your assignments. To succeed in this course it is important to read the feedback and incorporate it in your later assignments. As with anything in the course, the instructor will be available to answer any questions or clarify points in the grading and feedback.

Assignments	Points	Percent of Grade
Canvas discussion posts	50	**5 %**
Spectroscopy Project		**15 %**
Pre-lab	50	
Lab notebook, technique, and safety	50	
Write-up	50	
Recrystallization Project		**15 %**
Pre-lab	50	
Lab notebook, technique, and safety	50	
Write-up	50	
Magnetism Project		**15 %**
Pre-lab	50	
Lab notebook, technique, and safety	50	
Write-up	50	
Proposal		**50 %**
Annotated bibliography (written)	75	
Topic discussion (oral)	75	
Proposal draft (written)	25	
Proposal (written)	125	
Proposal presentation (oral)	100	
Proposal questions and reviews (oral/written)	50	
Response to questions and reviews (written)	50	
Total	**1000**	

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Final Examination or Evaluation

The proposal presentations, peer reviews, and responses to the reviews will serve as the culminating experiences of this course. Your presentations will be on the last day of class (May 14, 2021) via Zoom with peer reviews due on May 17, 2021, and responses to the reviews due by the end of the assigned exam time (9:30 am) on Wednesday, May 19, 2021.

Grading Information

Determination of Grades

Points will be distributed as described in Course Requirements and Assignments above. The course grade will be determined from the resulting average of the point total as follows. I reserve the right to shift the point breakdown for the course, but I will only do so in the direction that will benefit the class (i.e. the breakdown below is the hardest grading breakdown possible).

Percentage of Total Points	Final Course Grade
96-100	A+
92-95.9	A
88-91.9	A-
84-87.9	B+
80-83.9	B
76-79.9	B-
72-75.9	C+
68-71.9	C
64-67.9	C-
60-63.9	D+
56-59.9	D
52-55.9	D-
< 52	F

Classroom Protocols

Be on time to class. This semester we will have some class periods over Zoom and some in person. It is your responsibility to keep track of when and where you need to be. There are no additional times to make-up lab work because of the COVID limitations. You must be present at each of your assigned lab periods in order to complete the work required for this course. Similarly, no make-up sessions will be available for oral presentations. That said, under unavoidable circumstances, contact me ASAP so that we can figure out an accommodation.

For our Zoom meetings, please find a place where you will be able to use your microphone and webcam. Unless an alternative plan is determined with me before the second class period, I expect everyone to be able to do "face-to-face" discussions so that you can participate during the class meetings. Virtual backgrounds are acceptable as long as they are not distracting and as long as they do not violate the guidelines for a safe and respectful community listed below.

I hope that the classroom will serve as an environment that will promote learning and the development of new ideas, as well as be a safe and respectful community in person and online. Behavior that interferes with the normal academic function in the lab is unacceptable. Students exhibiting this behavior will be asked to leave the class and will not be given the opportunity to make up the time. The university has a brochure on student conduct that you can view at http://www.sjsu.edu/studentconduct/docs/ENGLISH%20Brochure.pdf.

Safety

This semester we must keep in mind COVID safety as well as lab safety. You will need to complete the COVID safety training from the department before being admitted to class. You will also need to take and pass a course-specific safety quiz with a score of 80% or higher to remain enrolled in the course. This should be easily accomplished based on your participation in our class safety discussion and your previous lab safety training.

Laboratory Sessions

Students MUST adhere to safety regulations outlined during our safety discussion and the COVID safety training at all times. Persistent failure to adhere to safety protocols will result in a failing grade or removal from the course. Experiments unrelated to the assigned project will not be allowed in the laboratory under any circumstances, and students engaging in such experiments will be withdrawn from the laboratory immediately.

Email Policy

I receive a lot of emails, so to be sure that I see your email, all Chem 146 emails should have Chem 146 in the subject line. I will do my best to respond to class-related emails within 1 business day of receiving them, however, keep in mind that this may not always be possible, especially during high volume times (e.g. around exams). Please try not to wait until the last minute to ask questions via email. I may also be slower to respond to emails late at night or over the weekends. Office hours are the best way to get timely answers to more complicated questions. You can also message me via Canvas and I will target a similar turnaround time.

Collaborative Work

Some of the work for the course will be done with your classmates or using data from your classmates. Even so, everyone is responsible for their own work. Most importantly, plagiarism of any sort will not be tolerated. Students who do not submit their own work will receive a zero, and continuing to do so will result in a failing grade in the course.

Assignment Deadlines

The COVID-19 pandemic and tumultuous happenings causing havoc in our world are still forcing us to work and learn under very strange circumstances. This may make it more difficult for you to maintain a steady course schedule and you may need to miss class or an assignment at some point in the semester. If this is the case, please contact me *ahead* of time and with as much of a heads up as possible and we can discuss the situation. Generally, all assignments are required to be submitted on or before the assigned deadline, but I will do my best to be accommodating for unforeseen circumstances if I receive appropriate communication of the conflict.

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant information to all courses, such as academic integrity, accommodations, dropping and adding, consent for recording of class, etc. is available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/".

Safe and Respectful Community

I hope that the classroom will serve as an environment that will promote learning and the development of new ideas, as well as be a safe and respectful community. Behavior that interferes with the normal academic function in a classroom is unacceptable. Students exhibiting this behavior will be asked to leave the class. The university has a brochure on student conduct at http://www.sjsu.edu/studentconduct/docs/ENGLISH%20Brochure.pdf.

Examples of such behavior include

1. Persistent interruptions or using disrespectful adjectives in response to the comments of others.
2. The use of obscene or profane language.
3. Yelling at classmates and/or faculty.
4. Persistent and disruptive late arrival to or early departure from class without permission.
5. Physical threats, harassing/bullying behavior, or personal insults (even when stated in a joking manner).
6. Use of personal electronic devices such as pagers, cell phones, PDAs in class, unless it is part of the instructional activity.

Physical-Inorganic Techniques, Chem 146, Spring 2021, Course Schedule

The tentative course calendar below includes the course schedule, assignment due dates (by 11:59 pm unless indicated otherwise), and presentation dates. Dates may be subject to change, but prior to this, fair notice will be given during class and through Canvas.

I know things are due every week, but the vast majority of these assignments are short and should not take a lot of time. Also, the assignments leading up to the proposal are intended to help you write a strong proposal and force you not to leave the work until the last minute, which would make the final assignments impossible.

Tentative Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	F 01/29	Full class meeting via Zoom
2	F 02/05	Full class meeting via Zoom – Safety quiz due, Pre-lab A due
3	F 02/12	Friday #1 groups in lab – Proposal discussion post 1
4	F 02/19	Friday #2 groups in lab – Pre-lab B due
5	F 02/26	Friday #1 groups in lab – Proposal discussion post 2
6	F 03/05	Friday #2 groups in lab – Pre-lab C due
7	F 03/12	Friday #1 groups in lab – Project A discussion post
8	F 03/19	Friday #2 groups in lab – Annotated bibliography due
	03/22 - 25	Topic discussions with Dr. Radlauer will be scheduled for a time during this week
9	F 03/26	Friday #1 groups in lab
	F 04/02	*Spring recess, no class*
10	F 04/09	Friday #2 groups in lab – Proposal draft due, Project B discussion post
11	F 04/16	Friday #1 groups in lab – Write-up A due
12	F 04/23	Friday #2 groups in lab – Write-up B due
13	F 04/30	Friday #1 groups in lab – Written proposal due, Project C discussion post
14	F 05/07	Friday #2 groups in lab – Write-up C due
15	F 05/14	Proposal presentations via Zoom
	Su 05/16	Peer reviews due
	W 05/19	*Assigned Final Exam time (7:15 to 9:30 am)* Responses to reviews and course surveys due by 9:30 am.
	F 05/28	*Grades due* (grades will be available starting Saturday 05/29)