

**San José State University**  
**Chemistry Department**  
**CHEM 131A, Biochemistry Lab, Fall 2021**

**Course and Contact Information**

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<b>Office Hours:</b>	Mon and Weds 11:00AM-noon ( <i>other times by appointment</i> )
<b>Class Days/Time:</b>	Tues and Thurs 9:00-11:50AM
<b>Classroom:</b>	DH 609/611
<b>Prerequisites:</b>	CHEM 113A, CHEM 55, and CHEM 55L (with grades of "C" or better; "C-" not accepted). CHEM 130A (Pre/Corequisite).

**Canvas Web Page**

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Learning Management System course login website. You are responsible for regularly checking with the messaging system through [MySJSU](http://my.sjsu.edu) at <http://my.sjsu.edu> to learn of any updates.

**Course Description**

Fundamental qualitative and quantitative techniques and methodology in modern biochemistry. This is a laboratory course focusing on the development of intermediate laboratory skills in modern biochemistry using the context of experiments examining biologically relevant molecules. These skills will comprise technique, the observation, recording, and evaluation of data acquired in the course of laboratory work, and the reporting of experimental results. This course is designed to foster skills in proper laboratory practice and record keeping, the use of biochemical instrumentation, the proper interpretation of experimental results, and the effective communication of the results through written reports.

**Course Goals**

When you complete this laboratory course, you will have achieved the following:

- reasonably adept skills with biochemical experimental techniques
- ability to collect appropriately detailed data
- skill at analyzing and interpreting data
- understanding of the limitations of any one dataset
- increased comprehension of the material covered during class sessions

## Course Learning Outcomes (CLO)

Students will learn how to carry out independent experimental work in a laboratory setting while investigating a research problem, utilize appropriate instrumentation and techniques to accomplish this and communicate the results of the work in the form of a clearly written journal article.

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

1. Demonstrate understanding of core concepts, methods and limits of scientific investigation to effectively solve problems in biochemistry.
2. Answer questions regarding safe practices in the laboratory and chemical safety.
3. Demonstrate safe laboratory skills (including proper handling of materials and chemical waste) for particular laboratory experiments.
4. 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.

## Required Texts/Readings

### Lab Manual

The lab manual will be posted on Canvas. Reading and reviewing the given experimental background is expected before coming to lab. The laboratory exercises can be found in the manual and will be supplemented with information on Canvas.

### Other Readings

You may use textbooks from previous or current classes as well as online sources to enhance your understanding of experiments. Papers from the scientific literature and educational videos will be suggested for additional information on certain topics.

## Course Requirements and Assignments

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. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

### Laboratory Notebooks

For the lab, you need to have a notebook that is bound, for recording data and observations you make during each laboratory. *Any bound notebook will suffice.* Do not use pencil. Always use a permanent ballpoint pen. Make sure you write clearly, include all significant figures, and label all units. The clearer you are with your notebook, the easier it will be to write up your laboratory reports. Also, it is fine to write in the first person (usually plural “we”). Since you are the one(s) who performed the experiments, take credit for it. It is imperative that all experimental data is recorded in the laboratory notebook and that this information is kept up to date. Never depend on your memory to record such data; you will probably forget it if it is not written

down. Notebook entries should be clear and concise. Entries should be neat enough (and annotated when necessary) so that the experimental notes and data can be read and understood by others. If any data are rejected for some reason, neatly cross out the entry with a single line and enter a brief explanation beside it. Don't obliterate what has been written down! Never discard or tear out a notebook page. Your notebook will be graded on these criteria. Scanned pages of your notebook will be handed in via Canvas periodically for evaluation. (Note that professional labs typically use duplicate or triplicate copy notebooks.)

### **Laboratory Reports**

Laboratory reports will be required for most experiments. These are to be completed outside of the laboratory period. The required content of each will be explained in class.

Each summary/report must be typed and include figures and tables as necessary. The due dates for submission of specific reports will be provided on Canvas with ample time for preparation. Failure to submit a report by a specified deadline will automatically lower the grade by 5% of the maximum for each day it is late. This includes non-lab days. For example, if a report is due on a Tuesday and you turn it in between the beginning of class on Tuesday and midnight on Wednesday, your grade will be lowered by 5%. If you turn in the late report during class on Thursday, your grade will be lowered by 10%.

Reports are due on the due date. Reports submitted on the due date but later than the time they are due are considered late.

Students will write one "group" lab report during the semester. This is designed to encourage cooperation and participation as well as foster good writing and teaching skills. Each member of the group will receive the same grade for the group report. If any member of the group has not contributed equally to the report up to two days before the due date, that individual must write his or her report alone. It is the responsibility of the group members to let the instructor know if any member of the group is not contributing.

Formal lab reports in this course are designed to teach you about how scientific researchers write articles for publication in peer reviewed journals. These are often the articles that lead to information used by the general public to inform our health habits and our education. In the scientific community they are referred to as "primary literature."

### **Quizzes**

Sometimes, online quizzes to be required before coming to lab as part of your pre-lab. These will be short and cover the main points of the day's experiment. They are designed to assess preparedness for the lab exercise.

### **Final Examination**

There will be one final exam. The exam will cover theory, experimental protocol and data analysis associated with the experiments. It is expected that all students will take the final; make-up exams will not be given. The final exam must be taken at the scheduled time in order to pass the course.

### **Required COVID Safety**

All students registered for a College of Science (CoS) class with an in-person component must view the [CoS COVID-19 Training](#) slides and the [SJSU Phased Adapt Plan](#) website and electronically sign the CoS Acknowledgement form located in the associated Canvas course prior to the second class meeting for CoS classes. Failure to comply with the safety requirements outlined in the CoS COVID-19 Training slides, the SJSU Phased Adapt Plan, and outlined by instructors and TAs for in-person classes will be grounds for dismissal from class or laboratory and building or field site. Please review

this material as needed throughout the semester, as updates will be implemented as changes occur (and posted to the same links).

## Grading Information

Pre-lab assignments are graded based on completeness and correctness. Each student must show a full understanding of the experiment or exercise to be completed on the given day.

The grade for this course is heavily dependent on lab reports. Each individual lab report will be graded according to its unique rubric that will be discussed during each separate lab. The required section to be written of the report for each lab will vary, and this variation is indicated and explained in the lab manual.

Part of your grade will be an instructor evaluation. Instructor evaluation is based on technique, organization, comprehension of experiments, preparation, involvement in class discussion, involvement in group work, attention to laboratory safety and proper disposal of waste, etc.

## Determination of Grades

The final exam will contribute 50 points toward the grade. The reports and various assignments associated with the experiments will contribute an additional 210 points. Pre-labs, short assignments, quizzes, and instructor evaluation comprises the remaining 60 points of the total.

Pre-lab pages, as described in the lab notebook section of the manual, are due on Canvas before the lab begins will not be accepted after this time. I do not care what kind of lab notebook you use but you must turn in a scan of your lab notebook pages in the assignment on Canvas.

The final course grade will be determined by rounding your final score to three significant figures and assigning grades as follows:

<u>Score Average</u>	<u>Final Course Grade</u>
97.0-100	A+
93.0-96.9	A
90.0-92.9	A-
87.0-89.9	B+
83.0-86.9	B
80.0-82.9	B-
77.0-79.9	C+
73.0-76.9	C
70.0-72.9	C-
67.0-69.9	D+
63.0-66.9	D
60.0-62.9	D-
< 60.0	F

Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See [University Policy F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

## **Classroom Protocol**

You should read the safety section of the SJSU Catalog under Chemistry Department. Note in particular: “Failure to comply with proper procedures and prescribed safety cautions shall subject the student to disciplinary action. 1) Any student engages in unauthorized experimentation, or who seriously disregards safety, thereby endangering self and others shall be withdrawn immediately from the class with a grade of F. 2) Any student who shows persistent disregard for safety may have his/her grade lowered, and may risk being withdrawn with a final grade of F.”

Since this is a lab course, you are expected to arrive on time with pre-lab activities prepared. For many of the experiments, you will work in groups. For the success of the group, each group member is expected to participate fully with each experiment.

At SJSU, we hope that the classroom and laboratory 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 lab is unacceptable. Students exhibiting this behavior will be asked to leave the class. Examples of such behavior include

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

## **University Policies**

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>” Make sure to review these university policies and resources.

## **Student Technology Resources**

Computer labs for student use are available in the [Academic Success Center](http://www.sjsu.edu/at/asc/) at <http://www.sjsu.edu/at/asc/> located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

## **SJSU Peer Connections**

Peer Connections, a campus-wide resource for mentoring and tutoring, strives to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. You are encouraged to take advantage of their services which include course-content based

tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10<sup>th</sup> and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit [Peer Connections website](http://peerconnections.sjsu.edu) at <http://peerconnections.sjsu.edu> for more information.

### **SJSU Writing Center**

The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the [Writing Center website](http://www.sjsu.edu/writingcenter) at <http://www.sjsu.edu/writingcenter>. For additional resources and updated information, follow the Writing Center on Twitter and become a fan of the SJSU Writing Center on Facebook. (Note: You need to have a QR Reader to



scan this code.)

### **SJSU Counseling and Psychological Services**

The SJSU Counseling and Psychological Services is located on the corner of 7<sup>th</sup> Street and San Carlos in the new Student Wellness Center, Room 300B. Professional psychologists, social workers, and counselors are available to provide confidential consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit [Counseling and Psychological Services website](http://www.sjsu.edu/counseling) at <http://www.sjsu.edu/counseling>

## CHEM 131A/ Biochemistry Lab, Fall 2021, Course Schedule

*The schedule is subject to change. Changes will be noted on Canvas.*

<b>Date</b>	<b>Experiment</b>	<b>Due Date</b>
8/19	No Class	
8/24	Check-in, Lab orientation, Safety Training	
8/26	Hypothesis Case Study*	
8/31	Nuts and Bolts	8/31
9/2	Formatting a Lab Report*	
9/7	pH & Buffers	
9/9	pH & Buffers	9/16
9/14	Laboratory Ethics Case Studies*	
9/16	Protein Structure: 3D Models*	
9/21	Protein Structure: 3D Models*	
9/23	Protein Structure: 3D Models*	9/28
9/28	QC Biologics	
9/30	QC Biologics	
10/5	QC Biologics	10/12
10/7	Writing Workshop*	
10/12	Chimera Exercise: Neuraminidase*	
10/14	Chimera Exercise: Neuraminidase*	10/19
10/19	Enzyme Kinetics	
10/21	Enzyme Kinetics	
10/26	Enzyme Kinetics	
10/28	Enzyme Kinetics	
11/2	Enzyme Kinetics	11/9
11/4	Computer Programming and Biochemistry: Python*	11/4
11/9	Exploring Carbohydrates	
11/11	<i>Veteran's Day – No Class</i>	
11/16	Exploring Carbohydrates	11/23
11/18	Structural Biochemistry*	
11/23	Structural Biochemistry*	
11/30	Structural Biochemistry*	12/2
12/2	Clean Up and Check Out	
12/14	CUMULATIVE FINAL EXAM 9:45AM-12:00PM	

\*Dry Labs are noted with an asterisk\*