

**San José State University**  
**Chemistry Department**  
**CHEM 130B, Biochemistry (I), Section 01, Fall 2022**

**Course and Contact Information**

Instructor(s): Professor Laura Miller Conrad

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Office Hours: Mondays and Wednesdays, 12-1 pm and by appointment.

Office Hours Location: DH 608 or Zoom by request

Class Days/Time: Mondays and Wednesdays 10:00-11:40 am

Classroom: Duncan Hall 135

Prerequisites: CHEM 112B (with a grade of “C” or better, “C-” not accepted)

GE/SJSU Studies Category: Partial fulfillment of Area R

**Course Description**

CHEM 130A explores the chemistry of amino acids, carbohydrates, lipids and nucleotides. Protein structure and function, protein isolation, enzyme kinetics and enzyme mechanisms are also investigated.

**Course Web Page (Canvas)**

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the [Canvas Learning Management System course login website](https://sjsu.instructure.com/) at <https://sjsu.instructure.com/>. You are responsible for regularly checking with the messaging system used by Canvas to learn of any updates. For help with using Canvas, see the [Canvas Student Resources page](http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources) at [http://www.sjsu.edu/ecampus/teaching-tools/canvas/student\\_resources](http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources).

**GE Learning Outcomes (GELO)**

CHEM 130A leads to partial fulfillment of Area R: Earth, Environment, and Sustainability (Upper Division B). The Area R requirement will be fulfilled after completion of CHEM 131B. Area R courses apply the scientific method and quantitative reasoning to engage in ethical, civic-minded inquiry around sustaining the earth, its environments and its inhabitants. The GELOs will be cultivated throughout the course and assessed on in-class activities, literature assignments, quizzes and/or exams.

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

1. apply scientific principles and the scientific method to answer questions about earth, the environment, and sustainability while recognizing the limits of both the method and principles;

2. apply mathematical or quantitative reasoning concepts to the analysis and generation of solutions to issues of earth, the environment, and sustainability;
3. communicate a scientific finding, assertion, or theory to a general audience with the integrity and rigor of the underlying science; and
4. explain ethical, social, and civic dimensions of scientific inquiry.

### Course Learning Outcomes (CLO)

CHEM 130A covers the following Program Learning Objectives (PLOs):

1. PLO 1.1 - Students will be able to identify, formulate, and solve a range of chemistry problems (fundamental to complex) through application of mathematical, scientific, and chemical principles.
2. PLO 1.2 - Students will be able to recognize, relate, and/or apply chemistry terms and concepts to propose and solve interdisciplinary and multidisciplinary real world problems.
3. PLO 3.1 - Students will be able to explore, critique, and reflect on how chemistry relates to society, culture, and issues of equity and ethics that shape their scientific beliefs and identities.
4. PLO 3.2 - Students will be able to identify as scientists within the scientific community through constructing peer reviews, engaging in collaborations, and participating in mentorship.
5. PLO 4.1 - Students will be able to design and deliver engaging presentations on diverse chemistry topics in a professional manner and with clear, concise organization that demonstrates mastery of the topic.

Upon successful completion of this course, students will be able to describe and solve problems related to:

1. CLO (1): the major classes of biomolecules
2. CLO (2): the chemicals and physical mechanisms of their action
3. CLO (3): the experimental basis by which these mechanisms are deduced

### Required Texts/Readings

#### Textbook

Nelson and Cox, *Lehninger Principles of Biochemistry*, 8<sup>th</sup> Edition is recommended. The book is available in a variety of formats including softcover (ISBN: 9781319228002) and loose-leaf sheets (ISBN: 9781319322342). The hardcover format is available at the Spartan Bookstore. Earlier editions are also acceptable. The 8<sup>th</sup> edition will also be available on reserve at the library. Recommended homework problems will be given from the 6<sup>th</sup>-8<sup>th</sup> editions.

#### Other Readings

Alberts et al., *Molecular Biology of the Cell*, 4th edition (optional). This is a good resource for background on molecular biology concepts. It can be accessed for free on [Pubmed](https://pubmed.ncbi.nlm.nih.gov/) at <http://www.ncbi.nlm.nih.gov/books/NBK21054/>.

#### Library Liaison

Anne Marie Engelsen (annemarie.engelsen@sjsu.edu)

## Course Requirements and Assignments

Graded work will include a total of three quizzes (lowest of four quizzes is dropped), four exams (including the final; lowest of four exams is dropped), a literature assignment, and participation in class activities, which all contribute to the course learning outcomes. Due dates for assignments are in the Course Schedule below and on Canvas. Additional homework problems from the text will be suggested, but not graded. It is assumed that students will do all suggested homework. Working the homework problems is an excellent way to prepare for exams and quizzes. Work in the course will be weighted as shown below:

Assignments	Points	% of Grade
Quiz Score (Sum of top 3 scores from Quizzes 1-4)	45	18%
Exam 1-3 + Final (Sum of top 3 scores from Exams 1-3 + Final)	120	48%
Literature Assignment	40	16%
In-class Activities	45	18%
<b>Total</b>	<b>250</b>	<b>100%</b>

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. Please also consult other SJSU syllabus [policies](http://www.sjsu.edu/senate/docs/S16-9.pdf) at <http://www.sjsu.edu/senate/docs/S16-9.pdf> and [resources](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) at <https://www.sjsu.edu/curriculum/courses/syllabus-info.php>

### Exams and Quizzes

Quizzes and exams will be given at an exact date and time in-person. Only non-programmable calculators will be allowed on quizzes and exams.

### In-Class Activities

Participation in in-class activities will be assessed by completion of the activity (for example, completion of the worksheet, voting in an iClicker poll, etc.). Note, you must be present in during the activity to get credit for in-class activities. Points will be distributed as follows: 40 points will be award for completing 85% of homeworks/in-class activities, 37 points for 80%, 33 points for 75%, 30 points for 70%, 27 points for 60%, and 23 points for 50%. A score of 20 points will be awarded for less than 50% completion of homeworks/in-class activities. Your participation will be prorated for that day if a legitimate excuse is provided within 24 hours of the absence (or as soon as possible for more complicated circumstances). Should you have a technical difficulty with iClicker/REEF Polling, you must notify me by 6 pm of that class day.

### Literature Assignment

Details for the literature assignment, including the rubric, will be announced in class and posted on Canvas. Plagiarism will not be tolerated.

### Final Examination or Evaluation

The final exam is comprehensive. Because it is an equal weight as the other exams, it will also be an equal time length (from 7:50 am – 9:30 am).

## Grading Information

Points will be distributed as described in Course Requirements and Assignments above. I reserve the right to scale quiz and exam grades. If scaled, each quiz or exam will be given a raw score and a scaled score. The raw score will simply be the number of points earned for correct answers on a particular exam or quiz, while the scaled score will be used to calculate your final grade. Scores will never be scaled down from your raw score. Generally, the average score on an exam will be scaled to a C minus, however, I reserve the right to adjust this in either direction if, in my estimation, the class overall performed differently than a “typical” class. The course grade will be determined from the resulting final point total as follows:

<u>Final Point Percentage (%)</u>	<u>Final Course Grade</u>
97 to 100	A plus
93 to 96.9	A
90 to 92.9	A minus
87 to 89.9	B plus
83 to 86.9	B
80 to 82.9	B minus
77 to 79.9	C plus
73 to 76.9	C
70 to 72.9	C minus
67 to 69.9	D plus
63 to 66.9	D
60 to 62.9	D minus
less than 60	F

## Minimum Grading Practice

The minimum grade awarded on exams, quizzes, literature assignments, and in-class activities will be a score of 50%. This is a more equitable grading practice that helps students recover from missed assignments or particularly poor assignment performances. If you are interested in learning more about this practice, see Webb, *Phys. Rev. Educ. Res.* **2020**, *16*, 020114 and Paul, *Phys. Rev. Phys. Educ. Res.* **2022**, *18*, 020103.

## Missed Exams and Quizzes

If an exam or quiz is missed without a legitimate excuse a scaled score of 50% will be entered for that exam. If an acceptable excuse is provided then the exam grade will be prorated. In no case will a make-up exam or quiz be given after the date of the exam or quiz. Contact me in advance if you will miss a quiz or exam date for a legitimate activity. Note, The lowest quiz from quizzes 1-4 and the lowest exam from exams 1-3 and the final exam will be dropped.

## Exam Regrades

If you feel that an error was made in the grading of your quiz or exam you may submit the quiz or exam with a written description of the error to me for regrading not later than one week after the graded quiz or exam is returned to the class.

## Late work

Literature assignments submitted after the due date on Canvas are considered late and subject to 5% point reduction (and subsequent 5% point reductions for each further day late). No late assignments will be accepted after the end of the Final Exam time slot (Thurs. Dec. 8 at 9:30 am).

## Plagiarism

Plagiarism on literature assignments will not be tolerated and will result in a score of 0 points for the assignment.

## Classroom Protocol

At SJSU, we 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. It is expected the students attend class and arrive on time. Please act in a professional manner throughout the class. This includes treating yourself, your classmates, and your instructor with respect.

Behavior that interferes with the normal academic function in a classroom is unacceptable. Students exhibiting this behavior will be asked to leave the class.

## University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the [Syllabus Information web page](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>). Make sure to visit this page to review and be aware of these university policies and resources.

## Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf) (<http://www.sjsu.edu/senate/docs/S12-7.pdf>) requires students to obtain instructor's permission to record the course:

- Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. *The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.*
- Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. *You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent. This includes all recorded lectures that appear on Canvas and/or YouTube.*

## Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) (<http://www.sjsu.edu/senate/docs/S07-2.pdf>) requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. Find more information at the [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) at <http://www.sjsu.edu/studentconduct/>.

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

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 through SJSU Counseling and Psychological Services (CAPS). To schedule an appointment or learn more information, visit the [Counseling and Psychological Services website](http://www.sjsu.edu/counseling) at <http://www.sjsu.edu/counseling>.

## CHEM 130A, Biochemistry I, Fall 2022, Course Schedule

*Note – the schedule is subject to change with fair warning. Changes will be noted in class.*

Class	Date	Readings and Topics
1	Aug 22	Chapter 1.1, 1.4-1.5 – Biological foundations
2	Aug 24	Chapter 1.2-1.3 – Chemical and physical foundations
3	Aug 29	Chapter 2.1-2.2 – Noncovalent interactions and acid/base chemistry
4	<b>Aug 31</b>	<b>Quiz 1</b> ; Chapter 2.3 – Buffers
	<i>Sept 5</i>	<i>Labor day - no class</i>
5	Sept 7	Chapter 3.1-3.2 – Amino acids and peptides
6	Sept 12	Chapter 3.4 – Proteins: primary structure
7	<b>Sept 14</b>	<b>Exam 1</b>
8	Sept 19	Chapter 3.4, 4.1-4.2 – Proteins: primary and secondary structure
9	Sept 21	Chapter 4.2-4.3 – Proteins: secondary and tertiary structure
10	Sept 26	Chapter 4.3, 3.3 - Proteins: tertiary structure and purification
11	<b>Sept 28</b>	<b>Quiz 2</b> ; Chapter 4.4 – Protein denaturation
12	Oct 3	Chapter 4.4 – Protein folding
13	Oct 5	Chapter 4.4, 5.1 – Protein folding and binding
14	Oct 10	Chapter 5.1 – Protein binding
15	<b>Oct 12</b>	<b>Exam 2</b>
16	Oct 17	Chapter 5.1 – Protein binding
17	Oct 19	Chapter 6.1-6.3 – Enzymes: Intro, function and kinetics
18	Oct 24	Chapter 6.3 - Enzyme kinetics and inhibition
19	<b>Oct 26</b>	<b>Quiz 3</b> ; Chapter 6.3 - Enzyme inhibition and bisubstrate reactions
20	Oct 31	Chapter 6.4 – Chymotrypsin
21	Nov 2	Chapter 6.4 and 7.1 – Other enzyme mechanism principles and monosaccharides
22	Nov 7	Chapter 7.1 – Mono- and disaccharides
23	<b>Nov 9</b>	<b>Exam 3</b>
24	Nov 14	Chapter 7.2-7.4 – Polysaccharides and glyconjugates
25	Nov 16	Chapter 10.1-10.2 – Storage and structural lipids
26	<b>Nov 21</b>	<b>Literature assignment due</b> ; Chapter 10.2, 11.1-11.2 – Structural lipids and membrane structure and dynamics
	<i>Nov 23</i>	<i>Thanksgiving holiday – no class</i>
27	<b>Nov 28</b>	<b>Quiz 4</b> ; Chapter 11.1-11.2 – Membrane structure and dynamics
28	Nov 30	Chapter 11.3, 12.1– Membrane transport and signaling
29	Dec 5	Chapter 12.2,12.6– GPCRs and gated ion channels
Final	<b>Thurs., Dec. 8 7:50-9:30 am</b>	<b>Comprehensive Final Exam</b>