

San José State University
Department of Chemistry
Chem 131B, Biochemistry Lab, Sections 05-06, Spring 2021

Course and Contact Information

Instructor:	Alberto A. Rascón, Jr., Ph.D.
Office Location:	Duncan Hall (DH) 612
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Email:	alberto.rascon@sjsu.edu (preferred method of contact)
Office Hours:	T, R 11:30 am – 12:30 pm or by appointment through zoom
Class Days/Time:	W 2:30 – 5:20 pm, F 1:30 – 5:20 pm (scheduled)
Classroom:	Online Format
Prerequisites:	CHEM 100W, CHEM 130A, CHEM 131A (with grades of “C” or better; “C-” not accepted)
Co-requisite:	CHEM 130B or CHEM 130C
GE/SJSU Studies Category:	Area R (Earth and Environment)

Course Format

Canvas Web Page

Course materials such as syllabus, handouts, notes, assignment instructions, videos, etc. can be found on the Canvas learning management system course website (**CANVAS** at <http://www.sjsu.edu/ecampus/teaching-tools/canvas/index.html>). *You are responsible for regularly checking with the CANVAS messaging system to learn of any updates.*

Due to COVID-19 guidelines and restrictions, all lecture content and experimental procedures will be provided and uploaded to CANVAS. *It is your responsibility to ensure that all videos are viewed before quizzes and the midterm exam.* Scheduled quizzes will be given before presenting of new experiments to ensure students are viewing the material. This will be done to ensure student success.

Live Zoom Class and Office Hours

The material provided (lectures, slides, experimental procedures, etc...) will be uploaded on to CANVAS. *The class is completely online and live Zoom lectures will be recorded.* During the recording, students can keep their cameras off. However, when the lecture is not being recorded, student cameras should be on in order to properly engage with the instructor and class (participation points are included in the Instructor Eval, see page 4). Furthermore, if the student needs personal addressing during an office hour, then the camera should be turned on. *Only students enrolled in Chem 131B will have access to Chem 131B Zoom lessons.*

Course Description

A capstone course on advanced isolation techniques and enzyme methodology. Chem 131B is the second semester of a two semester biochemistry laboratory course. The laboratory work is associated with intermediate qualitative and quantitative techniques in modern biochemistry. *A capstone experience requires students to integrate principles,*

theories, and methods learned in previous courses (Chemistry, Biology, and Biochemistry, to name a few) throughout the major. Students will be working on a research project that will allow analysis, synthesis, and evaluation of learned knowledge and will communicate the results of the project effectively in a professional manner via oral presentations and a written research report.

Learning Outcomes

Chem 131B addresses the following Program Learning Objectives:

1. PLO (5): Demonstrate understanding of core concepts and to effectively solve problems in biochemistry.
2. PLO (6): Answer questions regarding safe practices in the laboratory and chemical safety.
3. PLO (7): Demonstrate safe laboratory skills (including proper handling of materials and chemical waste) for particular laboratory experiments.
4. PLO (9): Effectively present a scientific paper orally, as per at an American Chemical Society symposium.
5. PLO (10): Write a formal scientific laboratory report, using the format and style of an article in a peer-reviewed American Chemical Society journal.

GE Learning Outcomes (GELO)

GE Area R (Earth and Environment) Goal

Students will cultivate knowledge of the scientific study of the physical universe or its life forms.
Students will understand and appreciate the interrelationship of science and human beings to each other.

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

1. Area R GELO (1): Demonstrate an understanding of the methods and limits of a scientific investigation.
2. Area R GELO (2): Apply a scientific approach to answer questions about the earth and the environment.

This course fulfills the GE writing requirement as follows:

Summary of Required Writing

Total writing will include a minimum of 5000 words:

1. In class writing will include maintaining an accurate and up-to-date laboratory notebook.
2. Rough draft of sections for the final lab report.
3. Final draft of lab report.

“A minimum aggregate GPA of 2.0 SJSU Studies (R, S & V) shall be required of all students as a graduation requirement.” To see full text, review [University Policy S11-3](http://www.sjsu.edu/senate/docs/S11-3.pdf) at <http://www.sjsu.edu/senate/docs/S11-3.pdf>.

Course Learning Outcomes (CLO)

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

1. CLO (1): Apply proper laboratory practices including safety, waste management, and record keeping.
2. CLO (2): Use and understand modern biochemical techniques and instruments.
3. CLO (3): Plan, design, and execute experiments based on biochemical literature.

4. CLO (4): Interpret experimental results and draw reasonable conclusions.
5. CLO (5): Communicate effectively through written and oral reports.

Required Texts/Readings

Textbook

No textbook is required for the course.

Other Readings

Alberts *et al.*, *Molecular Biology of the Cell*, 4th Ed. (*optional*)

This is a good source for background information on molecular biology concepts. It can be accessed for *free* on PubMed (<https://pubmed.ncbi.nlm.nih.gov>) at <https://www.ncbi.nlm.nih.gov/books/NBK21054/>. *Copy the link and paste it in the search box if you have trouble clicking on this.*

Occasionally, papers from the literature will be suggested for additional information on certain topics covered.

Other technology requirements / equipment / material

Research laboratory notebooks will be kept online using Google Docs (ensure the lab instructor has access on the first week of class); scientific calculator (equivalent to Ti 30) capable of performing linear regression analysis. No graphing calculators, unless memory is cleared by the instructor.

Library Liaison

Yen Tran (yen.tran@sjsu.edu)

Course Requirements and Assignments (Required)

“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 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, 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>.

Assignments The course will consist of the following:

Assignments	Points
Midterm Exam at Home (Mar. 19) (GELO 1, 3; CLO 2, 4; PLO 5)	100
Final Lab Research/Report (Due May 21) (GE writing requirement; CLO 1-4; PLO 5, 8)	100
Assignments (Info will be provided on Canvas) (GELO 1, 3; CLO 1-3; PLO 5-7)	100
Notebook and Instructor Evaluation (GE writing requirement; CLO 1-4; PLO 7)	75
Journal Article Presentation (GELO 1, 3; CLO 4-5; PLO 5, 8)	25
Quizzes (Eight Total, Lowest Score Dropped)	70
Total	470

Instructor Evaluation

The instructor evaluation is based on in-class participation, performance, lab organization, comprehension of experiments, attitude, understanding of proper use and disposal of chemicals, preparation prior to class, following directions, involvement, etc... (25 pts).

Midterm Exam and Quizzes

One exam will be given during the semester. The midterm will be given on **Friday (March 19th), starting at 1:30 pm**. Due to COVID-19 restrictions, the format of the midterm exam will be to allow students to take the exam at home. However, to minimize cheating, the exam will be emailed in PDF format 10 to 15 min before the scheduled class period along with an MS document with a disclaimer, which students are required to type in their name and date (this is considered "signed") agreeing to the conditions. The MS document will also be where the student will type in their answers, showing any work that is required. ***The student will have until 5:20 pm (Mar. 19th) to complete the exam, and once the exam is completed, the MS document with the "signed" disclaimer and answers will be uploaded to a Google Drive folder with their name, or if issues arise, emailed directly to me. If the exam is not in the folder or my email inbox by 5:20 pm or the disclaimer is not "signed," the exam will not be graded and a grade of "F" (0 pts) will be given.***

The disclaimer is: By typing my name below (in lieu of my signature), I will agree to work on the midterm exam alone and only utilize the materials provided by the instructor on CANVAS (lecture videos, notes, slides, and any pertinent material posted on this website). ***Other material or websites not found posted on the Chem 131B CANVAS website cannot be used, especially Chegg or other similar sites.*** If I am caught posting midterm exam questions on any sites or it is determined that I have cheated, a grade of "F" (0 pts) will be given and I will be reported to the Office of Academic Integrity and may lead to SJSU University dismissal.

A total of eight (8) quizzes (5 questions each (2 pts each), with the exception of the Safety Quiz, which is 10 questions (1 pt each)) will be given throughout the semester (with seven (7) counting towards the final grade, the lowest graded quiz will be dropped). The Exam and Quizzes (with the exception of the Safety Quiz) will cover theory, experimental protocol and data analysis. The content will be a combination of objective, calculations, short answer, short essay questions written as multiple-choice questions or true/false. The same rules apply as to the midterm exam, see disclaimer above. ***It is important to note that quizzes will cover material that has been presented prior to the day of the quiz AND will include at least one question from experiments being presented that day, meaning that you should be comfortable with all the information and always come ready to class!***

Quizzes will be made available online to all students and will be scheduled for 15 min only. Detailed information will be posted on CANVAS. Briefly, the online quiz questions will only be shown one at a time, and once an answer is chosen and submitted, the student will not be able to go back and change their answer. ***There are no re-do quizzes!*** Therefore, pay special attention and make your selections carefully.

Missed Exam and Quizzes

If the midterm exam or quiz is missed ***without*** a legitimate excuse a scaled score of zero (0) will be entered for that exam or quiz. If an acceptable excuse is provided, then the quiz or exam grade will be prorated. ***In no case will a make-up exam or quiz be given. In addition, there are no quiz re-grades.***

Midterm Exam Re-grade

The student has 7 calendar days from the date they have received the exam to bring to my attention any perceived errors in grading. However, in doing so, I have every right to review the entire exam, re-grade and adjust the grade accordingly, whether it is to your advantage or disadvantage. ***Only one re-grade is allowed and the score given on the re-grade is FINAL! Important to note that no re-grade will be accepted or considered after the 7-day period.***

To request a re-grade, the student should follow the exact steps shown below:

1. On a separate document, note the question(s) or problem(s) that the student wants the instructor to review (keeping in mind that I have the right to review the entire exam).
2. Include your justification for the re-grade (what do you think is the problem with the way the question or problem was graded?) Include any supporting information such as a page from the lecture, slides, or other relevant info.
3. Submit all of the necessary information to the instructor 7 days from the date the exam was received.

It is important to note: Re-grade requests based on another student's graded exam (for example, "Another student answered the same question the same way I did and received more points") will require that both exams be submitted for a re-grade so that both may be adjusted, if necessary. Errors in adding scores is not considered a re-grade, so submitting an exam for this type will not be checked otherwise. ***Be aware that students who submit frivolous re-grade requests may become ineligible to receive future letters of recommendation from me and may be reported to the Office of Academic Integrity.***

Laboratory Notebook

It is imperative that all experimental data are 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 forget it if it is not written down. Notebook entries should be clear and concise. Entries should be neat enough and annotated so that the experimental notes and data can be read and understood by others. Your notebook will be graded on these criteria.

It is important to note that in professional settings, the notebook is the primary document verifying your intellectual property. Establishing good notebook habits now will prepare you for your career.

You will use Google docs to maintain the Laboratory Notebook. Ensure that NB pages are up to date and completed by the end of each laboratory period. ***Since notebooks will be kept as a Google doc, the instructor will be checking notebooks periodically, sometimes without notice. Students will be reminded in class every day to ensure that these notebooks are kept up to date.*** Feedback will be given to ensure the correct information and materials are found in the NB.

Laboratory (Research) Report/Paper

A report of all laboratory work will be required in the form of a scientific journal article, specifically based on the ACS Biochemistry journal. This is to be completed outside of the lab period (and if time permits, with some class time dedicated to help with this). The required content and format will be explained in lecture videos posted on CANVAS with appropriate PDF files. ***Although the data presented to each student may be the same, all interpretations must be your own.*** Details regarding the format of the paper (final lab report) will be available on [CANVAS](#) and discussed periodically. **The final report is limited to an overall 2,500-word minimum, not including figures and tables. Points will be lost if the minimum word count is not met or if the word count is overly exceeded. In addition, any late papers will accrue a 5% reduction for each late day.**

Oral Presentation

Only one oral presentation is required. This presentation is a "journal article" presentation. ***The instructor must approve the journal article and the approved journal article must be emailed to the instructor at least two weeks in advance of the presentation (see schedule below).*** The selected article should be a recent primary article (published within the last 5 years) and closely related to the laboratory project. The required content and format of the presentation will be explained in the Introduction to Chem 131B Lecture video posted on [CANVAS](#).

[University Policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states, "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."

Grading Information

Points will be distributed as described below. I reserve the right to scale exam grades. If scaled, scores will never be scaled down from your raw score. Generally, the average score on an exam will be scaled to the C+/B- range, though 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 average of the point total as follows:

<u>Percent Average</u>	<u>Final Course Grade</u>
97-100	A+
94-96	A
90-93	A-
87-89	B+
84-86	B
80-83	B-
77-79	C+
74-76	C
70-73	C-
67-69	D+
64-66	D
60-63	D-
< 60	F

Late Assignments, Extra Credit, and Misc. Information

The student assignments are due at the beginning of the laboratory period, unless otherwise stated. Assignments submitted on the due date but later than the beginning of class are considered late and subject to a 5% point reduction (and subsequent 5% point reductions for each further day late). Many assignments will be required to be emailed directly to the instructor, so any email time stamped later than the start of class (whether it is due Wed. (2:30 pm) or Fri. (1:30 pm)) will incur a 5% reduction, and as above, subsequent 5% point reductions for each further day late.

There is **NO extra credit or extra assignments** during or after the semester is over, ***so please don't ask.***

“Passage of the Writing Skills Test (WST) or ENGL/LLD 100A with a C or better (C- not accepted), and completion of Core General Education are prerequisite to all SJSU Studies courses. Completion of, or co-registration in, 100W is strongly recommended. A minimum aggregate GPA of 2.0 in GE Areas R, S, & V shall be required of all students.”

Note “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

Students are expected to log on, on time, and attend all classes. Students should be courteous and professional to other students, the instructor, teaching assistants, and/or guest instructors. ***In addition, no cell phones are allowed during class time. If the need of a cell phone arises, the student shall leave the class to do so. However, if in doing so becomes distracting and problematic and impedes normal academic function, the student will be asked to leave the zoom.***

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. ***Behavior that interferes with the normal academic function in a classroom***

is unacceptable. Students exhibiting this behavior will be asked to leave the zoom or blocked from entering the session. 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.

The university has a brochure on student conduct that you can view at <http://www.sjsu.edu/studentconduct/docs/ENGLISH%20Brochure.pdf>.

Laboratory and COVID-19 Safety

You should read the safety section of the SJSU Catalog under the 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 who engages in unauthorized experimentation or who seriously disregards safety, thereby endangering self or 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.” ***This information is not so relevant for these sections of Chem 131B this semester, but students should be aware and understand the safety precautions.***

NOTE: A safety quiz will be given during the second day of class and must be passed with a grade of 80% or better. The quiz will be based on the [SJSU Chemistry Department Safety Sheet](http://www.sjsu.edu/chemistry/Documents/Safety%20Sheet%20for%20Teaching%20Laboratories_053118.pdf) found at: http://www.sjsu.edu/chemistry/Documents/Safety%20Sheet%20for%20Teaching%20Laboratories_053118.pdf

In addition, all students are required to complete the **College of Science COVID-19 Training**, which can be found in the following link: <https://drive.google.com/drive/folders/1guyc7ntqG5qGEbJeuZg6DMglhzllIFmC>

Ensure completion of the training video because material from the video will be on the safety quiz.

Some important guidelines (obtained from the COVID Training)

- a) If attending class or you are on campus, you must at all times wear a face covering and practice social distancing. Face masks are provided near the elevators of each floor, so if you do not have one or require a new one, the University has provided stations. Designated 6 ft areas have been designated in the classroom in order to help with social distancing.
- b) When arriving to lab, make sure you wash your hands for at least 30 sec or use alcohol-based hand sanitizers.
- c) If you have to come to campus, make sure that if you do not feel well or are experiencing any COVID-19 symptoms, ***STAY HOME***.
- d) If you have come in contact with anyone that has tested positive or is showing symptoms and not tested positive, please self-quarantine and let the instructor know as soon as possible. Furthermore, you are required to report your positive result to the University. Utilize the following link: <https://comm.sjsu.edu/Q0QQ0iK0UV2Eh0J5M00a240>.

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/>.

Chem 131B: Biochemistry Lab, Spring 2021, Course Schedule

The schedule is subject to change. Changes will be noted in class or posted on Canvas.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	Jan. 27	Intro to Lab, Green sheet info, Semester goals, Journal Articles and Research Paper Info: Live Zoom
1	Jan. 29	Lecture 1: Recombinant DNA Technology (Bacterial Expression Vectors, Cloning, Primer Design); Primer Design: Live Zoom – Online Safety Quiz #1 (10 pts)
2	Feb. 3	Lecture 2: Plasmid Transformation of pET28b Vector; Overnight Cultures: Live Zoom – Google Lab Notebook Access Due before class (5 pts)
2	Feb. 5	Vector DNA Extraction (Mini Prep), NanoDrop, DNA Electrophoresis: Live Zoom – Primer Design Report Due (20 pts); Online Quiz #2 (10 pts)
3	Feb. 10	Lecture 3: Agarose Gel Electrophoresis; Restriction Enzyme Digestion of Vector DNA/dephosphorylation: Live Zoom
3	Feb. 12	Lecture 4: PCR, PCR Settings, Exp. Procedures, and Results: Live Zoom – Journal Articles for Presentations Due (5 pts); Online Quiz #3 (10 pts)
4	Feb. 17	Lecture 5: PCR Mechanism of Action; PCR Product Gel Extraction, Restriction Enzymes Digestion, Co-Extraction/Purification, Ligation, and Transformation: Live Zoom
4	Feb. 19	Colony Re-Streaking, Colony PCR, DNA Electrophoresis: Live Zoom – Online Quiz #4 (10 pts)
5	Feb. 24	Review of material up to this point; Work on online notebook, and Journal Article Presentation: Live Zoom
5	Feb. 26	Work on Journal Article Presentation: Live Zoom
6	Mar. 3	Journal Article Presentations (25 pts): Live Zoom – Rd #1
6	Mar. 5	Journal Article Presentations (25 pts): Live Zoom – Rd #2
7	Mar. 10	Overnight Culture of Plasmid DNA, Plasmid DNA Extraction, NanoDrop and Preparation for DNA Sequencing: Live Zoom
7	Mar. 12	Lecture 6: DNA Sequencing Analysis: Live Zoom
8	Mar. 17	DNA Sequencing Analysis Cont... Work on report in class; Midterm Exam Review: Live Zoom
8	Mar. 19	Midterm Exam (100 pts) – At Home (1:30 to 5:20 pm)
9	Mar. 24	Work on Introduction Draft: Search for articles, etc...: Live Zoom – DNA Sequencing Analysis Report Due (25 pts)
9	Mar. 26	Work on Introduction Draft Cont...: Live Zoom
10	Mar. 31	Week of Spring Recess
10	Apr. 2	Week of Spring Recess
11	Apr. 7	Lecture 7: Recombinant Protein Expression and Transformation into T7 Shuffle

Week	Date	Topics, Readings, Assignments, Deadlines
		Cells: Live Zoom – Online Quiz #5 (10 pts); Intro Draft Due (15 pts)
11	Apr. 9	Bacterial Growth Experiment at 30°C (LB/TB Media) – set, follow growth, collect samples: Live Zoom – Results and Discussion Example
12	Apr. 14	Lecture 8: SDS-PAGE Analysis, Gel Electrophoresis of Proteins; Sample preparation and running of gel; Results: Live Zoom
12	Apr. 16	Bacterial Growth Experiment at 30°/10°C (TB Media only) and SDS-PAGE Analysis; Work on notebook in-class: Live Zoom – Online Quiz #6 (10 pts)
13	Apr. 21	Work on Results/Discussion Section In-Class: Live Zoom
13	Apr. 23	Work on Results/Discussion Section In-class Cont...: Live Zoom – Online Quiz #7 (10 pts)
14	Apr. 28	Review of Semester Materials for Final Research Paper; Work on lab notebook: Live Zoom – Results and Discussion Draft (30 pts)
14	Apr. 30	Catch up Day, work on notebook, research paper: Live Zoom – Online Quiz #8 (10 pts)
15	May 5	Work on lab notebook; Work on Final Research Paper
15	May 7	Work on Final Research Paper Cont...
16	May 12	Work on Final Research Paper Cont...
16	May 21 Final Day	Final Report Due (beginning of scheduled Final Exam) at 12:15 pm in my email inbox (100 pts)