

**San José State University**  
**Charles W. Davidson College of Engineering// College of Science/**  
**Chemical and Materials Engineering//Chemistry**  
**ChE 293//Chem 293, Applied Bioinformatics, Fall 2019**  
**Section 01 (47716)// Section 01 (50190)**

**Course and Contact Information**

<b>Instructors:</b>	Dr. Brooke Lustig//Mr. Jonathan Oribello
<b>Office Location:</b>	DH417/DH007
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<b>Office Hours:</b>	T (Tuesdays) 0930-1000 (note office phone 408.924.4968); TBD// F (Fridays) 0900-1000 (by appointment only, also available at other times remotely by email appointment)
<b>Class Days-Time:</b>	T 1800-2000; 2000-2045 (activity component)
<b>Classroom:</b>	Zoom/DH503
<b>Prerequisites:</b>	Senior or graduate standing in engineering or science.  At least one lecture or lab course in Biochemical Engr., Biochemistry, Organic Chemistry, Physical Chemistry for Life Sciences or Molecular Biology is strongly suggested.

**Faculty Web Page**

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on my faculty web page on Canvas at <http://sjsu.instructure.com>. You are responsible for regularly checking to learn of any updates.

**Course Description**

Bioinformatics theory and applications including sequence search, proteomics, molecular modeling, and combinatorial methods. Students will work in teams and be guided in independent inquiry to solve practical bioinformatics problems.

This is a special topics course that includes elements of a workshop and seminar. Emphasis will be on providing students the background and practical experience with relevant computational/theoretical methods that allow independent inquiry. The course also delves into the underlying theory for a range of bioinformatics applications, including sequence searching, molecular modeling and large-scale data analysis. The course is built around the examination of key references as well as presentations of cutting-edge research methods and results from SJSU and associated faculty. In addition, multi-disciplinary groups will consult the most current literature in order to develop a coordinated set of review/grant proposals that will include some preliminary results and/or specific methods. Individual interaction, including feedback from the instructors, is also emphasized.

## Course Learning Outcomes (CLO)

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

1. Understand critical ideas and methods in Bioinformatics, including approaches to large-scale data analysis.
2. Utilize the literature in the field.
3. Develop and apply analytic skills to bioinformatics research inquiries.
4. Learn to work in teams, coordinating research and communication objectives as well as developing novel preliminary results.
5. Think critically and analyze complex and abstract ideas, leading to writing a Grant Proposal.
6. Develop relevant oral and written communication skills.

## Required Texts/Readings

### Primary Readings

Links provided by instructor for relevant literature.

### Supplemental Textbooks

Zvelebil, M. & Baum, J. O. *Understanding Bioinformatics*. Garland, New York, 2008. ISBN: 978-0815340249.

### Other technology requirements / equipment / material

Laptops optional (PCs provided in Computer Lab DH503 for workshop activities).

### Library Liaison

Anamika Megwalu, (408) 808-2089, [anamika.megwalu@sjsu.edu](mailto:anamika.megwalu@sjsu.edu). Additional information and resources available at <http://libguides.sjsu.edu/>

Ann Marie Englesen, (408) 808-2007, [annemarie.englesen@sjsu.edu](mailto:annemarie.englesen@sjsu.edu); <http://libguides.sjsu.edu/chemistry>

## Course Requirements and Assignments

### Overview

Please note that the course is an applications oriented one (see Syllabus), focusing on computation applying widely utilized Bioinformatics methods to the most current problems in the biomedical molecular sciences.

### Final Examination or Evaluation

As noted in Syllabus the submission and screening of the Electronic Version of the Grant Proposal is considered the Final Exam. Note the following is a summary of assignments and their corresponding percentage of the final grade:

Assessment Tool	Percentage of Final Grade
Midterm exam (open book w/ some limitations)	25%
Homework and Participation	25%
Project Preliminary Results and Participation	15%
Oral Presentation of Preliminary Results	15%
Preview of Grant e-Proposal/Grant Proposal	20%

Please note that the Homework and Participation as well as the Project Prelim. Results and Participation grades include class participation in lectures, activities and discussion. Late assignments are not to be accepted without good cause (limited to documented health and family emergency issues). Finally, plagiarism and other cheating will not be tolerated, with a minimum penalty of an F for the particular assignment and, given the proper circumstances, an F for the entire course. Editing by others is confined to Grant Proposal related assignments and, then only by permission of the instructors.

Though this class is listed as A, B, C, D and F, + and - grades are assigned when appropriate. Note + given for grades at top of range and – given for grades at bottom of range; exact cut-offs depend on actual distribution of grades in a given class. Because this is a graduate class, grades lower than a B are not typical. There are no extra assignments after the semester is over.

### **Classroom Protocol**

Students are responsible for all information on the syllabus and handouts. If the student misses class it is their responsibility to obtain notes, handouts and other materials or communications provided in class. All class participants are expected to interact in a professional manner in all matters pertaining to this course.

We hope that the classroom and laboratory/activity 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 or 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) Persistent and disruptive late arrival to or early departure from class without permission.
- d) Physical threats, harassing behavior, or personal insults (even when stated in a joking manner).
- e) *Other inappropriate behavior e.g. yelling directed at classmates and/or faculty.*
- 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](#) at <http://www.sjsu.edu/gup/syllabusinfo/>.

### **Fall 2022 Paragraph for Syllabi on COVID-19 and Monkeypox**

Students registered for a College of Science (CoS) class with an in-person component should view the [CoS COVID-19 and Monkeypox Training](#) slides for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the [SJSU Health Advisories](#) website. By working together to follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in the training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links). Note COE students should also consult these links as well as any relevant emails.

# ChE 293//Chem 293/Applied Bioinformatics, Fall 2022, Tentative Course Schedule

Schedule is subject to change with fair notice; any changes will be announced in Canvas.

## Course Schedule

Number	Date	Topics, Readings, Assignments, Deadlines
1	8/23/22	Introduction; Syllabus; Review
2	8/30/22	Lecture: Review (cont.); Introduction to sequence alignment
3	9/06/22	Lecture: Sequence alignment; Common file structures: GenBank & PDB; Sequence homology-based parameters; RNA folding as model system
4	9/13/22	Lecture: Molecular mechanics, threading and integration of sequence homology; Large-scale data analysis
5	9/20/22	Lecture: Special Topics
6	9/27/22	Lecture: Special Topics/Overview of Group Projects Lecture
7	10/04/22	Midterm Exam
8	10/11/22	Project(s) Lecture More on Group Project Topics
9	10/18/22	Organize and Prepare Group Project Teams (Working Groups)
10	10/25/22	Working groups & Consultation
11	11/01/22	Working groups & Consultation
12	11/08/22	Working groups & Consultation
13	11/15/22	Lecture: More on Preliminary Results Summary; Review of Oral Presentation and Proposal
14	11/22/22	Working groups & Consultation; Prelim Result Summary due
15	11/29/22	Oral Presentation of Preview for Grant
16	12/06/22	Oral Presentation of Preview of Grant
	12/13/22	Final Exam equivalent: Electronic Submission of Grant Proposal 5:15-7:30pm
	12/15/22 Weds	Hard Copy Grant Proposal due by 4:00PM