

San José State University  
Computer Science Department  
CS/BIOL 123A Bioinformatics I, Sec 03, Spring 2025

Course and Contact Information

Instructor:	Leonard Wesley
Office Location:	MH 212
Telephone:	408.924.5287 (Office, however, I will not be on campus very frequently during the Spring 2025 semester.)
Email:	Leonard.Wesley@sjsu.edu
Office Hours:	Tuesdays 7:00AM – 9:00AM, Zoom Link For Office Hours For Spring 2025: <a href="https://sjsu.zoom.us/join/85152031440?occurrence=1738076400000&amp;meetingMasterEventId=obIP9RmRRue3ddxxFv2p5A">https://sjsu.zoom.us/join/85152031440?occurrence=1738076400000&amp;meetingMasterEventId=obIP9RmRRue3ddxxFv2p5A</a> PASSCODE: 168356
Class Days/Time:	Section 03: Tue and Thur 12:00 Noon –1:15 PM
Classroom:	MH 233
Prerequisites:	BIOL 30 and BIOL 31, or CS 46A and CS 46B

**Catalog Course Description:**

Introduction to the main public domain tools, databases and methods in bioinformatics. Analysis of algorithms behind the most successful tools, such as the local and global sequence alignment packages, and the underlying methods used in fragment assembly packages. Solution of complex biological questions requiring modification of standard code.

**Learning Outcomes :**

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

1. SLO-1 BIOLOGY BASICS: Review the biology central dogma, and review prerequisite course information about the structure and function of DNA, RNA, and Proteins.

2. SLO-2 BIOINFORMATICS DBs: Describe the structure of bioinformatics-related DBs and how they function to analyze sequence and related biological data. Navigate through various DBs to research and answer questions of interest, identify genes, and analyze complex genomes.
3. SLO-3 ALIGNMENT: Describe and use pairwise and multiple sequence alignment algorithms to conduct local, global, and semiglobal alignments. Understand and use BLAST and advanced DB searching methods.
4. SLO-4 PHYLOGENY: Build, understand, and use molecular phylogenetic trees. Understand and answer questions about evolution using molecular phylogenetic trees.
5. SLO-5 BIOINFORMATIC FRONTIERS: Understand the theory, practice, and use of the CRISPR-CAS9 gene editing technology.

## Required Texts/Readings :

### ***Textbook***

Bioinformatics and Functional Genomics Edition: 3<sup>rd</sup> Year 2015

Author: Pevsner

ISBN 13: 978-1-118-58178-0 Price ranges from \$39(Paperback) to \$73(e-Book)

### ***Other Readings***

***Introduction To Bioinformatics***

includes reading papers, vi

each team member. See the rubr

**Tentative course calendar of assignment due dates & exam dates:**

(Please note that course calendar below, and its content is “subject to change with fair notice”)

Week and Class Mtg #	Tue	Thur	Module # & Name	TOPIC	Assignment  See Canvas For Module & Weekly Assignment Details and Due Dates
Week 1	N/A	1/23	#1 Biology Basics	1/23 Intro To Course: -Topics, learning objectives, course logistics, Instructor background - Syllabus  Intro to molecular cell biology, DNA, RNA, and the Biology central dogma. - DNA Replication, Transcription, and Translation	Learning Module #1
Week 2	1/28	1/30	#1 Biology Basics	1/28: DNA Replication, Transcription, Translation,	

Week 3	2/4	2/6	#2 Bioinformatics DBs	2/4: - NCBI Gene, Protein, and Nucleotide DBs  2/6: - Possible Projects - Entrez DB - Ensembl DB	Learning Module #2
Week 4	2/11	2/13	#2 Bioinformatics DBs	2/11: - Entrez DB - Ensembl DB  2/13: - <a href="#">In-Class Exercise 1</a> <a href="#">Covers Topics From Week 1 thru Week 4</a>	Learning Module #2
Week 5	2/18	2/20	#2 Bioinformatics DBs	2/18: - Ensembl DB - UCSC Genomic DB  2/20: - UCSC Genomic DB	Learning Module #2  The deadline for students to Add or Drop classes via MySJSU with no petition is September 17 (per University Policy S22-6)  Project Proposals Due Wed 9/18
Week 6	2/25	2/27	#3 Alignment	2/25: - Pairwise Alignment  2/27: - <a href="#">Quiz 1 (~45 mins):</a> <a href="#">Covers Topics From Week 1 thru Week 5</a>	Learning Module #3
Week 7	3/4	3/6	#3 Alignment	3/4: - Pairwise Alignment  3/6: <a href="#">In-Class Exercise 2</a> <a href="#">Covers Topics In Class Exercise 1 thru Week 6</a>	Learning Module #3

Week 8	3/11	3/13	#3 Alignment	3/11: - Pairwise Alignment 3/13: - Multiple Sequence Alignment	Learning Module #3
Week 9	3/18	3/20	#3 Alignment	3/18: - Multiple Sequence Alignment 3/20: Midterm (Full period): Covers Topics Week 1 thru Week 8	Learning Module #4
Week 10	3/25	3/27	#3 Alignment	3/25: - Multiple Sequence Alignment 3/27: - Multiple Sequence Alignment	Learning Module #4
	3/31	4/4		SPRING BREAK	
Week 11	4/8	4/10	#4 Phylogeny	4/8: In-Class Exercise 3 Covers Topics In Class Exercise 1 thru Week 6 4/10: - Molecular phylogenetic Trees	Learning Module #4
Week 12	4/15	4/17	#4 Phylogeny	4/15: - Molecular phylogenetic Trees 4/17: Quiz 2 (~45 mins): Covers Topics Week 5 thru Week 10	Learning Module #4

Week 13	4/22	4/24	#5 Bioinformatic Frontiers	4/22: - Introduction CRISPR-CAS9  4/24 - CRISPR-CAS9 cont.	Learning Module #5
Week 14	4/29	5/1	#5 Bioinformatic Frontiers	4/29: - CRISPR-CAS9 cont.  5/1 - CRISPR-CAS9 cont.	Learning Module #5
Week 15	5/6	5/8	#5 Bioinformatic Frontiers	5/6: In-Class Exercise 4 (Work on Projects, Q&A)  5/8: Quiz 3 (~45 mins): Covers From Quiz 2 thru Week 16	Learning Module #5
			<p style="text-align: center;">Final Project Report and Code Due To Canvas Wednesday May 14, 2025 By 11:59PM</p> <p style="text-align: center;">No Final Exam. The Project Takes The Place Of The Final Exam</p>		

**SCHEDULE FOOTNOTES:**

NONE AS OF SPRING 2025

**Grades \***

WRITTEN HOMEWORK (4 at 20 pts each)	80 pts
QUIZZES (3 at 50pts each)	150 pts
MIDTERM	100 pts
IN-CLASS EXERCISES (4 at 50pts eac	



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times, the instructor might announce and give extra credit exercises or assignments in class or as work to be completed outside of classroom instruction. There is no guarantee that such extra credit exercises or assignments will be offered to the class. If, in the opinion of the instructor, offering such extra credit options will be significantly advantageous to the learning process, they might be offered.

### Late Assignment Submission

Late assignments will receive a 25% point deduction of a graded assignment for each 24hr period after the submission deadline. For example, if an assignment is worth 10 points, and the grade for the assignment is 8/10, and the assignment is submitted one day late, then the point deduction equals 2.5, and the final grade for the assignment is  $\text{MAX}(0, 8 - 2.5) = \text{MAX}(0, 5.5) = 5.5$ .

### Missed Assignments, In-Class Exercises, Quizzes, and Exams

#### A. QUIZZES:

- a. The grade for one missed quiz will be replaced with the average of the remaining two quizzes. The average is calculated as the sum of current quiz grades / the number of quizzes for the semester. For example, if quiz 1 = 85, quiz 2 = 95, and quiz 3 is missed, the quiz 3 grade will be replaced by  $(85+95)/3 = 60$ .
- b. More than one missed quiz will result in a grade of incomplete provided the total missed points for the semester is less than 20% of the total course points.

#### B. MIDTERM:

- a. The grade for a missed midterm exam will be 75% of the average score for quizzes, programming assignments, and homework assignments provided the total missed points for the semester is less than 20% of the total course points. Or, provide acceptable documentation of the reason for missing the midterm as described in version 1 of this course syllabus and a makeup exam will be provided.

#### C. HOMEWORK ASSIGNMENTS:

- a. The grade for one missed homework assignment will be replaced with the average of the remaining three homework assignments. The average is calculated as the sum of current homework grades / the number of homework assignments for the semester.
- b. The grade for the second missed homework assignments will be replaced with 75% of the average of the remaining two homework assignments.
- c. More than two missed homework assignments will result in a grade of incomplete provided the total missed points for the semester is less than 20% of the total course points. An alternative is to accept zeros for the



assigning a zero grade for all missed assignments will be assigned. An alternative grade or options can be discussed with the instructor.

### Grade Change Policy:

It is a university policy ([S09-7](#)) that “A change of grade request must be submitted by the department office directly to the Office of the Registrar in a timely fashion. Normally, such requests must be received by the drop deadline of the following semester. Requests for exceptions to this policy must be accompanied with a documented and compelling reason.”

### 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/>. Make sure to review these policies and resources