

San José State University
Computer Science Department
Computer Science / Biology 123B: Bioinformatics II, Spring 2017

Course and Contact Information

Instructor:	Philip Heller
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Email:	Philip.Heller@sjsu.edu
Office Hours:	Tu 10:30 – 11:30
Class Days/Time:	M/W 10:30 – 11:45
Classroom:	Duncan Hall 450
Prerequisites:	CS 23, and BIOL 115 or CHEM 130A; or CS 46B and a molecular biology course.

Course Description

Computational methods used for searching, classifying, analyzing, and modeling protein sequences. Tools for analyzing DNA and RNA sequences. More advanced topics, such as genetic algorithms and simulated annealing, which can be used to address folding problems. Prerequisite: CS 123A.

Course Learning Outcomes

Upon successful completion of this course, students will be familiar with the following concepts and will be able to apply them in appropriate situations:

- Technology for amplifying, sequencing, and assembling nucleic acids.
- Markov Chains, Hidden Markov Models, related algorithms, and applications.
- Approaches for mining large sequence databases.
- Metagenomic analysis.

Required Texts/Readings

Textbook

“Understanding Bioinformatics” by Marketa Zvelebil and Jeremy Baum, 1st edition, Garland Science, 2008, ISBN 0-815-34024-9.

Other technology requirements / equipment / material

Students must bring a wifi-enabled laptop computer to every class meeting except exam sessions.

Course Requirements and Assignments

Homework Assignments: There will be approximately 6 homework assignments. Homework is only accepted in hardcopy. No late homework will be accepted except by prior arrangement with the instructor or in cases of documented emergency. Homework is due at the end of class in hardcopy on the due date.

Term Project: Students will do a term project in teams of 1 or 2. Students in CS 123A must do a project that includes programming, in the language of their choice. Students in Biology 123A may do the same, or may do a project involving acquiring published data and then analyzing the data using 3rd-party bioinformatics tools.

Exams: Two in-class midterm exams (15% each) and one final exam (25%). Missed exams cannot be made up except for reasons of illness as certified by a doctor, or documentable extreme emergency. Makeup exams may be oral.

Grading:

Homework: 25%

Midterm 1: 15%

Midterm 2: 15%

Project: 20%

Final: 25%

At least	Letter Grade
97%	A+
93%	A
90%	A-
87%	B+
83%	B
80%	B-
77%	C+
72%	C
70%	C-
67%	D+
62%	D
60%	D-
<60%	F

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/>”

Computer Science / Biology 123A Fall 2016 Course Schedule

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1		No class. We meet M/W, Week 1 begins on a Thursday.
2	1/30	Intro to course. Amplification and sequencing.
2	2/1	Amplification and sequencing.
3	2/6	Amplification and sequencing.
3	2/8	Sequence assembly.
4	2/13	Guest speaker.
4	2/15	Hidden Markov Models.
5	2/20	Hidden Markov Models.
5	2/22	Hidden Markov Models.
6	2/27	Hidden Markov Models.
6	3/1	Review for Midterm #1.
7	3/6	Midterm #1.
7	3/8	Midterm #1 answers, Profile Hidden Markov Models.
8	3/13	Profile Hidden Markov Models.
8	3/15	Profile Hidden Markov Models, Hidden Markov Model Applications.
9	3/20	Hidden Markov Model Applications.
9	3/22	Guest speaker.
10	3/27	SPRING BREAK.
10	3/29	SPRING BREAK.
11	4/3	Metagenomics.
11	4/5	Metagenomics.
12	4/10	Review for Midterm #2.
12	4/12	Midterm #2.
13	4/17	Midterm #1 answers, Sequence data mining.
13	4/19	Codon usage.
14	4/24	Project presentations.
14	4/26	Project presentations.
15	5/1	Project presentations.
15	5/3	Project presentations.
16	5/8	Project presentations.

Week	Date	Topics, Readings, Assignments, Deadlines
16	5/10	Project presentations.
17	5/15	Review for final. Last class meeting before final.
Final Exam	5/19 (Friday)	Duncan Hall 450 (same room as lectures). 9:45 AM – Noon.