CSC 570: Special Topics in Computer Science
Bioinformatics
Fall 2011
Course Syllabus

September 18, 2011

Instructor: Alexander Dekhtyar
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What	When		Where
Lecture	TR	9:10 – 11:00am	14-232B
Final Exam time	December 6, 2011 (Tuesday)	10:10 - 1:00pm	14-232B

Note: the class will not have a written final exam, but the exam time will be used for presentations.

Office Hours

	When	Where
Tuesday	11:00am - 12:30pm	14-215
Wednsday	9:00am - 11:00am	14-215
Thursday	11:00am - 12:00pm	14-215

Additional appointments can be scheduled by emailing the instructor at *dekhtyar@calpoly.edu*.

Description

This course studies the application of computing techniques to solving problems in the field of bioinformatics and computational molecular biology.

The key learning outcomes for the course are as follows. Upon completion of the course, you will:

- Know the main problems in the field of bioinformatics and computational molecular biology.
- Understand the key algorithms used to solve computational biology and bioinformatics problems
- Model computational biology problems
- Apply algorithmic techniques to solve problems in computational biology and bioinformatics.

Texbook

Our main textbook is:

- N.C. Jones, P. Pevzner. *An Introduction to Bioinformatics Algorithms*, MIT Press, 2004, ISBN:978-0-262-10106-6.

Because of the interdisciplinary nature of the course, I strongly recommend actually purchasing the textbook.

In addition, we will be reading a number of papers throughout the quarter.

Topics

No.	Topic	Number of Lectures
1.	Introduction	4
2.	Exhaustive Search	1
3.	Greedy Algorithms	1-2
4.	Dynamic Programming	5-6
5.	Divide-and-conquer Algorithms	1
6.	Graph Algorithms	2
7.	Combinatorial Pattern Matching	2-3
8.	Clustering	2

Grading

Team Project	60%
Course Presentation	20%
Other assignments	20%

Course Policies

Prerequisites

The prerequisite for this course is CSC 349, Algorithms.

Exams

The course has **no exams.** Instead, there is a quarter-long team project with a number of deliverables (proposal, presentation, report), which accounts for 60% of the course grade.

The final exam time is reserved for final team presentations.

In-Class Presentation

Each student in the course will at some point prepare and give a presentation on a topic related to the area of bioinformatics algorithms and computational biology. To ensure that everyone has a chance, this will be a pair assignment. Each presentation is to be prepared and delivered by two people. This assignment will have a number of deliverables (topic choice, bibliography, lecture notes, presentation) spread over the quarter.

Three possible styles of presentation: (a) pick a sub-area or a problem in the area of bioinformatics and prepare a survey of the state-of-the-art in it; (b) pick a specific algorithmic problem, and present algorithms for solving it; (c) pick a specific paper and discuss its contribution to the field.

Homeworks, Programming Assignments

While the course does not have an intensive lab-based hands-on component, we may have one-to-three small programming assignments in the course to ensure that you've had a chance to implement some of the important bioinformatics algorithms. For example, everyone will implement BLAST, the de-facto standard sequence alignment algorithm, from scratch.

Communication

The class will have an official mailing list. The email address for the mailing list is *csc-560-01-2118@calpoly.edu*. All students enrolled in the class are automatically subscribed to the mailing list (using the email addresss that the CS department has on file).

I encourage questions during classtime and questions via email. My answers to email questions may be broadcast to the entire class via the mailing list, if the answer may be relevant to everyone (e.g. a correction in a text of a handout, or a clarification of a homework problem), and may also appear on the web page. The questions can also be posted to the mailing list directly. The mailing list will also be used for all annoucements related to the course. It is your responsibility to read your class-related email. Failure to read email posted to the mailing list cannot be used as an excuse in the class.

Web Page

Class web page can be found at

http://www.csc.calpoly.edu/~dekhtyar/570-Fall2011

Through this page you will be able to access all class handouts including homeworks, lab assignments, project information, lab/project data and lecture notes.

Links to additional information, and notes and announcements will also be posted.

Academic Integrity

University Policies

Cal Poly's Academic Integrity policies are found at

http://www.academicprograms.calpoly.edu/academicpolicies/Cheating.htm

In particular, these policies define *cheating* as (684.1)

> "*...obtaining or attempting to obtain, or aiding another to obtain credit for work, or any improvement in evaluation of performance, by any dishonest or deceptive means. Cheating includes, but is not limited to: lying; copying from another's test or examination; discussion of answers or questions on an examination or test, unless such discussion is specifically authorized by the instructor; taking or receiving copies of an exam without the permission of the instructor; using or displaying notes, "cheat sheets," or other information devices inappropriate to the prescribed test conditions; allowing someone other than the officially enrolled student to represent same.*"

Plagiarism, per University policies is defined as (684.3)

> "... the act of using the ideas or work of another person or persons as if they were one's own without giving proper credit to the source. Such an act is not plagiarism if it is ascertained that the ideas were arrived through independent reasoning or logic or where the thought or idea is common knowledge. Acknowledgement of an original author or source must be made through appropriate references; i.e., quotation marks, footnotes, or commentary."

University policies state (684.2): "Cheating requires an "F" course grade and further attendance in the course is prohibited." (appeal process is also outlined, see the web site above for details.). Plagiarism, per university policies (684.4) can be treated as a form of cheating, although a level of discretion is given to the instructor, allowing the instuctor to determine the causes of plagiarism and effect other means of remedy. It is the obligation of the instructor to inform the student that a penalty is being assessed in such cases.

Course Policies

All homeworks are to be completed by each student **individually**. Lab assignments are to be completed by the appropriate units (individual, pair, group), and no code/solution-sharing between units is permitted. Students are encouraged to discuss class content among themselves but NOT in a manner that constitutes plagiarism and cheating as defined above (e.g., you can solve together a problem from the textbook that had not been assigned in the homework, but you should solve assigned problems individually).