CSC 310 / BIO 310
Bioinformatics
Spring 2008

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Course web page: http://gcat.davidson.edu/bioinformatics/bioinf.html

Course description: Bioinformatics is an interdisciplinary course that explores mathematical, statistical and computational techniques useful in the study of genomes and proteomes.

Text: *Perl for Exploring DNA* by Mark D. LeBlanc and Betsey Dexter Dyer, 2007, Oxford University Press.

Course goals: (1) To understand and apply various algorithms and statistical tests for analyzing DNA, RNA and protein sequences, and DNA microarray data. (2) To gain practical experience with Perl, a programming language widely used in molecular biology, web programming, and text processing. (3) To effectively communicate and collaborate in multidisciplinary teams.

The following will help you assess your progress toward these goals:

Homework. Weekly assignments will provide you with practice with Perl programming and algorithms. Homework will be done in teams, with team members rotating regularly.

Reviews and Final. There will be two take-home reviews and a take-home final exam. You will have one week to complete each review and exam.

Projects. Interdisciplinary teams of students will complete two projects that involve building interactive web sites with Perl and CGI. Projects will address real-world problems and require biological research as well as programming and web page design.

Use of software: Perl is available in the GAMCo (Genomics, Applied Mathematics and Computer Science) lab and classroom (Chambers 3146), and may be installed on your own computer. It is built in to Mac OS X and is freely available on Windows computers from Active State. You will have access to GAMCo during building hours, whenever class is not in session (or, rarely, when the lab is reserved for a meeting). The class schedule for GAMCo will be posted on the door and on the Bioinformatics course web page.

Office Hours: Office hours, **every day 2-3 p.m**., are specifically dedicated to meeting with students in my office. Please feel free to drop by anytime I am in the office, or make an appointment for a specific time other than those I have listed. Email and IM are great ways to reach me, day and night.

Grading: Course grades will be computed as follows: Homework, 20%; Projects, 20%; Review I, 20%; Review II, 20%; Final Exam, 20%.

Approximate Schedule:

Date	Topic	Assigned	Due
Jan 15	Course overview; Unix, Perl, & Editors		
17	String Manipulation (Chapter 3)	HW 1	
22	Regular Expressions (Chapter 4)	HW 2	HW 1
24	Regex (Chapter 4), continued	HW 3	HW 2
29	Calculations (Chapter 5)	HW 4	HW 3
31	Control Structures (Chapter 6)	HW 5	HW 4
Feb 5	Subroutines (Chapter 7)	**Review 1**	HW 5
7	Reading Files (Chapter 8)		
12	Arrays (Chapter 9)	HW 6	**Review 1**
14	Web Forms and CGI	**Project 1**	
19	Sequence analysis & alignment		HW 6
21	Sequence analysis & alignment	HW 7	
26	Project Work Day		HW 7
28	Project Presentations		**Project 1**
Mar 1-9	SPRING BREAK		
Mar 11	Genes and promoters		
13	Genes and promoters	HW 8	
18	Sequence evolution models		HW 8
20	Phylogenetic trees	HW 9	
25	HOLIDAY		
27	Structure prediction		HW 9
April 1	Comparative genomics	**Review 2**	
3	Comparative genomics		
8	Microarray data analysis	HW 10	**Review 2**
10	Image analysis	**Project 2**	
15	Cluster analysis		HW 10
17	Special topics		
22	Project Work Day		
24	Project Presentations		**Project 2**
29	Special topics		
May 1	Wrap up, course evaluations	**Final Exam**	
6	No Class		
12	Exam due at 5:00 p.m.		**Final Exam**