CSE 308-408
Bioinformatics: Issues and Algorithms

Fall 2007 • TuTh 2:35 pm – 3:50 pm • Packard Lab 208

Instructor **Professor Daniel Lopresti**
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Office Hours 4:00 – 6:00 W (or by appointment)

Biology Advisor **Professor Jutta Marzillier**
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Grading Assistant **Wen Cheng**
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Textbooks *An Introduction to Bioinformatics Algorithms*, Neil C. Jones and Pavel A. Pevzner
MIT Press, ISBN 0-262-10106-8. (IBA)

Bioinformatics Biocomputing and Perl, Michael Moorhouse and Paul Barry
John Wiley & Sons, ISBN 047085331X. (BB&P)

Blackboard Lecture slides, assignments, etc. will be available @ http://ci.lehigh.edu

Grading

	CSE 308	CSE 408
• Homework assignments =	25% of grade	20% of grade
• Programming assignments =	25% of grade	20% of grade
• Final project or paper =	50% of grade	50% of grade
• Scribe duty (CSE 408 only) =	n/a	10% of grade

Notes

- Homework / programming assignments will generally be posted to Blackboard by 9:00 am and due by 5:00 pm on the specified day. Carefully follow all instructions when naming your programs and submitting your work.
- Assignments turned in up to one week late will received one-half credit. After that point, no credit will be given. Extensions must be approved by Professor Lopresti.
- If you already consider yourself proficient in Unix and Perl programming, you may choose to skip the lectures marked with an asterisk (*). Please skim the indicated reading, however, and review the lecture notes online in Blackboard.

Date	Topics	Readings	Other Activities
Tu 8/28	Course introduction		
Th 8/30	Intro to molecular biology *genetics and genomes, analyzing DNA*	IBA 3, BB&P 1	
Tu 9/4	Intro to algorithms *correctness, recursion, iteration, time complexity*	IBA 2, BB&P 2	HW #1 out
Th 9/6	Intro to Unix; Perl programming 1 * *getting started, control flow, variables, arrays, hashes*	BB&P 3-4	
Tu 9/11	Perl programming 2 * *subroutines, scoping rules, file I/O*	BB&P 5-6	HW #1 due
Th 9/13	Perl programming 3 *pattern matching, regular expressions, sorting*	BB&P 7-8	HW #2 out
Tu 9/18	Restriction mapping *biology, full and partial digests, brute-force and practical algorithms*	IBA 4.1-4.3	
Th 9/20	Motifs, search trees *regulatory motifs, profiles, search trees, motif-finding*	IBA 4.4-4.9	HW #2 due

Date	Topics	Readings	Activities
Tu 9/25	Genomics (Prof. Marzillier)	Reading TBA	HW #3 out
Th 9/27	Proteomics (Prof. Marzillier)	Reading TBA	
Tu 10/2	Genome rearrangements	IBA 5	HW #3 due
	biology, sorting by reversals, greedy and approximation algorithms		
Th 10/4	Sequence comparison & alignment 1	IBA 6.1-6.7	HW #4 out
	biology, comparison models, dynamic programming, global alignment		
Tu 10/9	No class		Pacing Break
Th 10/11	Sequence comparison & alignment 2	IBA 6.8-6.10	HW #4 due
	local alignment, gap penalties, multiple alignment		
Tu 10/16	Sequence comparison & alignment 3	IBA 7	HW #5 out
	saving time and space, divide-and-conquer		
Th 10/18	Sequencing & assembly 1	IBA 8.1-8.9	
	biology, graph theory, shortest superstrings, sequencing by hybridization		
Tu 10/23	Sequencing & assembly 2	IBA 8.10-8.15	HW #5 due
	protein sequencing, spectral analysis		
Th 10/25	Genetic pattern matching 1	IBA 9.1-9.5	HW #6 out
	repeat-finding, suffix trees		
Tu 10/30	Genetic pattern matching 2	IBA 9.6-9.8	
	heuristics: FASTA and BLAST		
Th 11/1	Tools, datasets, and applications	BB&P 17-18	HW #6 due
	EMBL/GenBank, SWISS-PROT/PIR, ClustalW, BLAST		
Tu 11/6	DNA microarrays	Reading TBA	HW #7 out
Th 11/8	Clustering for expression analysis	IBA 10.1-10.4	
	biology, hierarchical clustering, k-means		
F 11/9			Project proposals due
Tu 11/13	Evolutionary trees 1	IBA 10.5-10.7	HW #7 due
	biology, distance-based tree reconstruction, additive trees		
Th 11/15	Evolutionary trees 2	IBA 10.8-10.11	
	character-based tree reconstruction, parsimony (small and large)		
Tu 11/20	RNA and protein structure prediction	Reading TBA	
	RNA secondary structure prediction, protein threading		
Th 11/22	No class		**Thanksgiving Break**
Tu 11/27	Bioethics	Reading TBA	
Th 11/29	History of the Genetic Code	Reading TBA	
Tu 12/4	Student final project / paper presentations I		
Th 12/6	Student final project / paper presentations II		
F 12/7			Final projects due

Accommodations for Students with Disabilities

If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center C212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

Academic Integrity

The work you submit in CSE 308-408 must be entirely your own. While we encourage you to discuss basic concepts and strategies with friends and classmates, the copying or sharing of solutions to homework or programming assignments, or of final papers or projects, is never acceptable. Such cases will be referred to the University Committee on Discipline and, if found guilty, you may be given the failing grade WF in the course.

You should keep in mind that computer programs exhibit an individual's "style" just as much as other forms of authorship. Changing variable names, editing comments, or making other trivial updates in an attempt to hide plagiarism is rarely effective.

If you have questions about this policy at any point throughout the semester, ask. It is far better to be safe than sorry when your academic career may be on the line.