

Genomics and Applied Bioinformatics Biol 4803 Fall 2006

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Textbook: J. Pevsner, *Bioinformatics and Functional Genomics*, Wiley-Liss, 2003.

Additional readings: Several journal articles will be posted as pdf files on the course WebCT site.

Required equipment: You will need a USB drive to save your work from the computer lab sessions. I recommend 128 Mb minimum.

Learning objectives: You should be able to:

1. Locate and access a variety of public databases and software tools for bioinformatics.
2. Describe how common bioinformatics tools work, and the differences between different tools that accomplish similar tasks.
3. Identify which databases and software tools are most appropriate to discover and analyze new genes, and answer biological questions.
4. Use/apply the common tools appropriately, with knowledge of their limits and pitfalls.
5. Evaluate the statistical significance of results of bioinformatics searches and analyses, where appropriate.
6. Evaluate the biological significance of, or formulate new questions based on the results of, bioinformatics searches and analyses.

Grading:

10.00%	Weekly WebCT quizzes based on the reading - these quizzes must be completed by 10 am each Tuesday
40.00%	Two midterm exams
20.00%	Computer lab solutions to selected random problems
30.00%	Gene discovery and characterization project

Make-ups: You are allowed to miss one on-line quiz and one computer lab with no penalty, no questions asked. For missed exams, you must provide a documented legitimate excuse to schedule a make-up.

Policy on collaboration and the Honor Code: Discussion with peers is encouraged, both during lecture group discussion periods and during computer lab exercises. However, all work turned in must be of your own original efforts. Using the work of your peers or from any other sources, on-line or in print, without attribution is plagiarism. Plagiarism will result in zero credit for the assignment, and possible further penalties as an Honor Code violation.

Tentative Schedule of Topics - first iteration: The table below is a first approximation of the schedule of topics, beginning with approximately one chapter per week. As the course progresses, this schedule will be adjusted to fit the pace of learning.

<i>Week</i>	<i>Topic</i>	<i>Reading</i>	<i>Computer Lab</i>
1: 8/22-24	Intro, access to sequence data and related information	Ch 1,2	Pre-test; Ch 2 problems
2: 8/29-31	Pairwise sequence alignment	Ch 3	Ch 3 problems
3: 9/5-7	BLAST	Ch 4	Ch 4 problems
4: 9/12-14	Advanced BLAST EXAM 1	Ch 5	Ch 5 problems
5: 9/19-21	Bioinformatics approaches to gene expression	Ch 6	Ch 6 problems, gene discovery project
6: 9/26-28	Microarray data analysis	Ch 7	Ch 7 problems
7: 10/3-5	Proteomics	Ch 8	Ch 8 problems
8: 10/10-12	Protein structure	Ch 9	Ch 9 problems
9: 10/18,19	EXAM 2		No lab this week
10: 10/24-26	Multiple Sequence Alignment Molecular phylogeny	Ch 10, 11	Ch 10, 11 problems
11: 10/31-11/2	Completed genomes - viruses and prokaryotes	Ch 12-14	Ch 12-14 problems
12: 11/7-9	Eukaryotic genomes - fungi	Ch 15	Ch 15 problems
13: 11/14-16	Eukaryotic genomes - multicellular organisms	Ch 16	Ch 16 problems
14: 11/21,22	Human genome	Ch 17	Ch 17 problem
15: 12/5-7	Human genetic variation and medicine	Ch 18	Ch 18 problems
16: 12/13	Gene Discovery/Characterization Project due by 9:00 am		