GENE4220L
Bioinformatics and modeling laboratory
Spring 2010

Course description: A hands-on look at the role of bioinformatics in genetic and genomic analyses. This combination lecture/laboratory course will cover genomics and database searching, and will introduce students to genomics, RNA expression, proteomics, metabolomic and regulatory modeling approaches to the understanding of genetics and disease.

Class Time & Location: Tuesday and Thursday, 2:00 PM to 4:30 PM, Life Sciences C128

Prerequisites: GENE3200

Grading: This course is will be graded A-F with a total of 400 points (200 points per instructor). This is a laboratory class with ~2 hours of lecture/demonstration per week by the instructors and ~3 hours of "hands on" laboratory exercises supervised by the course assistant and/or instructor. Grades in the first half (Kissinger) will be based upon performance on lab and reading exercises (70%), quizzes (20%) and class participation (10%). Grades in the second half (Arnold) will be based upon weekly laboratory reports (90%) and class participation (10%).

In the first of the course half assignments are due when assigned, usually at the end of each lab period. In the second half laboratory reports are due one week from their day of assignment (usually a Tuesday) on the following Tuesday. Late assignments will only be accepted if the delay or absence is cleared with the instructor prior to the occurrence except in cases of emergency.

Text Book: The text is Discovering Genomics, Proteomics and Bioinformatics, Second Edition by Campbell and Heyer, Benjamin Cummings, 2007. It is available from the campus bookstore. **NOTE: A textbook is required for class. You will use it each day for lab exercises.**

Instructors: (Office hours will be arranged for each instructor)

Dr. Jonathan Arnold
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Course Assistants:
TBD

Laboratory Schedule:

Week 1

Jan 7	Introduction, how to use your computer and the text book
	Background on Bioinformatics/Genomics
Week 2	
Jan 12	Section 1.1 Introduction to NCBI OMIM, NCBI BLAST
Jan 14	Section 1.2
Week 3	
Jan 19	Section 2.1
Jan 21	Introduction to Gene Cards, review of BLAST, Tour of NCBI resources
	(Entrez, TaxBrowser, Genome, Pubmed, RefSeq)
Week 4	
Jan 26	Section 2.2
Jan 28	Section 2.3
Week 5	
Feb 2	Section 3.1
Feb 4	Section 3.2
Week 6	
Feb 9	Section 3.3
Feb 11	Discuss a paper from the literature (To Be Assigned based on interests)
Week 7	
Feb 16	Sections 4.1-4.2
Feb 18	Sections 4.3-4.4
Week 8	
Feb 23	Section 5
Feb 25	Bioinformatics Olympiad
Week 9	
Mar 2	Prade *et al.* (1997), building a map of a chromosome
Mar 4	Build a map of linkage group VII in *N. crassa*
Mar 9	Spring Break
Mar 11	Spring Break
Week 10	
Mar 16	Section 11.1, Introduction to genetic networks
Mar 18	Arnold et al. (2004), *qa* gene cluster and its simulation
Week 11	
Mar 23	Laboratory to build your own network
Mar 25	Section 11.2, build the toggle switch and study its behavior

Week 12
Mar 30   Section 11.2, repressilator
Apr 1   Get the repressilator to oscillate

Week 13
Apr 6   Battogtokh *et al*. (2002), identifying genetic networks
Apr 8   Identify the clock network as a laboratory

Week 14
Apr 13   Section 6.1, microaray analysis
Apr 15   Section 6.2, laboratory to identify all circadian genes

Week 15
Apr 20   Human Longevity
Apr 22   Georgia Centenarian Database

Week 16
Apr 27 -   review

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