

Course Syllabus Fall 2007
Biology 596 Molecular Evolution

Lecture: T, Th. 12:30 to 1:45PM

Place: LS 134

Lab: Thursday 2:00 PM to 4:40 PM

Place: LS 126

Instructor: Dr. Elizabeth Waters

Office: NLS 208 (in the back of the lab)

Office Hours: Monday 2-4 PM; Other times by appointment.

Office Phone: 594-7036

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Required Text: Bioinformatics Sequence and Genome Analysis 2004.

Other reading assignments will be on reserve in the library or will be posted to Blackboard.

Assignments and Requirements:

1. **Regular attendance and participations.** Students will be expected to read assigned materials before class and be able to contribute to class discussions.
2. **Two in-class exams.** (Short answer and essay)
3. **One written 5-7 page research paper with bibliography.** Students should choose a topic in consultation with the instructor by October 23. On Oct. 24 each student will submit a title, a one-paragraph summary of the topic and at least three references (peer reviewed articles). Research papers written for other classes are not permitted. Graduate students may not use thesis topic for this research paper. Research should be based on published peer-reviewed research articles, reviews and books. In addition all students will incorporate sequence analysis learned in to the lab to this project. Students will describe the purpose of the sequence analysis: What questions were you asking. How did you do the analysis, program, settings, sequences. What were the results and what were your conclusions. Late papers will have one half grade deducted (i.e. A to A-) for everyday past the due date.
4. **One 20-minute class presentation.**
5. **Take-home Exam Due .** Take home exam due Dec. 13 at 3PM. Typed (printed from computer) copies only- no handwritten exams no email. (Short answer and essay). **I will not accept late exams!**
6. Make-up exams will be given when a student misses for health or University sanctioned events. Documentation of illness or travel for sports etc may be required. Please contact the instructor before the exam is given to the class.

Learning Outcomes:

1. Students will learn, and be able to describe and apply methods of evolutionary analysis of DNA and protein sequences.
2. Students will be able to read and interpret primary literature in Molecular Evolution. They will demonstrate that they can evaluate the data presented in this literature and explain to the rest of the class and

the instructor how this data does or does not support particular models of gene and protein evolution.

3. Students will undertake independent research. They will demonstrate that they are able to identify related papers in the primary literature. They will also demonstrate that they can interpret both the data and the analysis of the data in these papers and synthesize this work in relation to the lecture material.

Grades and Evaluations:

Student grades will be based on attendance, classroom participation, in-class exams, one research paper, one in-class presentation and a final exam. The in-class presentation should be based on the research paper.

Total Points Possible	175
	Points for each
Attendance and participation	20
Exam One	25
Exam Two	25
Research Paper	25
In-class presentation	20
Computer Lab Assignments	30
Final Exam	30

Course Schedule:

Date	Lecture Topic	Readings
Aug. 28	Molecular Evolution Genes, Genetic Codes and Mutation	On Reserve: Chapter 1 Li& Graur
Aug. 30	Genes in Populations	On Reserve: L&G Ch. 2
Sept. 4	Genes in Populations	
Sept 6	The Neutral and Nearly Neutral Theory	Papers by T. Ohta, N. Moran On Blackboard
Sept. 11	The Neutral and Nearly Neutral Theory	
Sept. 13	Evolutionary Change in Sequences	On Reserve L&G Ch. 3
Sept. 18	Evolutionary Change in Sequences	On Reserve L&G Ch. 4
Sept. 20	Relative Rates, Molecular Clock	Blackboard: Near and Sanderson 2004

Sept. 25	Multigene Family Evolution	On Reserve L&G Ch.6
Sept. 27	Multigene Family Evolution	On Blackboard: Lynch and Katj 2004; Koonin 2005
Oct. 2	First Exam	
Oct 4	Adaptive Evolution and Detecting Selection	Blackboard Near et al 2004; Bargelloni et al 1998
Oct. 9	Adaptive Evolution and Detecting Selection	Blackboard: Starret and Waters 2005
Oct. 11	Adaptive Evolution and Detecting Selection	
Oct. 16	Transposable Elements Horizontal Evolution	On reserve L&G Ch. 7
Oct. 23	The Tree of Life- Cellular evolution	
Oct. 25	Organelle Evolution- Paper Topics Due	On Reserve L&G Ch.8
Oct. 30	Genome Evolution	Archibald 2002
Nov. 1	Genome Evolution	Tringe et al 2005
Nov. 6	Evolutionary Genomics	Giovannoni et al 2005
Nov. 8	Second Exam	
Nov. 13	Evolutionary Genomics	
Nov. 15	Applied Molecular Evolution	Palacknal et al 2004
Nov. 20	Applied Molecular Evolution	
Nov. 22.	No Class Happy Thanksgiving!	
Nov. 27	Viral Evolution	Nelson and Holmes 2007
Nov. 29.	Viral Evolution	

