

MWF 11:30-12:20 am, S110 Foegen
Instructor: Dr. Mary Kuhner
Office: S420C Foegen (you will need to call me on the lobby phone to get in)
Office Hours: TBA, or by appointment
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The first half of the course will cover the basic building blocks of evolution: inheritance, mutation, natural selection, recombination, genetic drift, and population structure. The second half will look at specific areas of evolutionary biology: the generation of genetic novelties, genome evolution, selfish DNA, the evolution of sex, speciation, and phylogeny inference. The basic forces interact in real biological systems to produce diverse and sometimes bizarre results.

Homework will be handed out on Friday and will be due the following Friday at the beginning of class (see syllabus for exceptions). You may work together on the homework, but please be sure you know how to do it on your own or the exams will be too difficult. Late homework up to one week will count for half credit.

Each exam (midterm and final) will cover 1/2 of the class. Exams are primarily problem-solving. You may use a calculator, and an equation sheet will be provided. Except in acute emergencies, make-up exams must be arranged in advance. The final exam is scheduled for December 13, 2:30-4:20 pm.

The course grade will be based 1/3 on the midterm, 1/3 on the final, and 1/3 on the homework. The lowest of the 9 homeworks will be dropped in calculating the final grade.

This is primarily a course in how to reason about evolution, and will emphasize problem-solving skills heavily. If this is difficult for you, I urge you to visit office hours and work with me right away, because it is not a skill you can learn while cramming for the exams! I will provide two non-graded problem collections for additional practice.

There is no textbook for this course. Books you may find useful include Felsenstein's *Theoretical Evolutionary Genetics* (available on the Web at <http://evolution.genetics.washington.edu/pgbook/pgbook.html>), Hartl and Clark's *Principles of Population Genetics*, and Graur and Li's *Fundamentals of Molecular Evolution*. The syllabus on the next page suggests readings from the Felsenstein book, but be aware that this book is designed for a graduate course, and goes into much more detail than we will. Note that all readings are OPTIONAL: everything necessary for the course will be covered in lectures. Lecture slides will be posted on the course web page, often (but not always) before the corresponding lecture.

The course web page includes a GoPost bulletin board which can be used for any course-related questions and discussions. You may find that other students can offer a useful perspective on topics you're struggling with. Please do not post anything confidential on this board as it is open to anyone with a UW NetID.

Course Schedule

Fels: Felsenstein *Theoretical Evolutionary Genetics*GL: Graur and Li *Fundamentals of Molecular Evolution*HC: Hartl and Clark *Principles of Population Genetics*

Day	Date	Topic	HW	Optional readings
Wed	Sep 27	Introduction		
Fri	Sep 29	Mendel and Hardy-Weinberg	HW1 assigned	Fels. I.3-4, I.10 first page
Mon	Oct 2	Mutation		Fels. III.1-2
Wed	Oct 4	Dominance and Recessiveness		
Fri	Oct 6	Directional Selection	HW1 due; HW2 assigned	Fels. II.4 p. 43-44, 47-48
Mon	Oct 9	Overdominance and Underdominance		Fels. II.6
Wed	Oct 11	Linkage and Recombination		Fels. I-8, VIII.3
Fri	Oct 13	Genetic Drift	HW2 due; HW3 assigned	Fels. VI.1, VII.1-2
Mon	Oct 16	Drift versus Selection		Fels. VII.7
Wed	Oct 18	Tests of Neutrality		GL chapter 4
Fri	Oct 20	Population Subdivision	HW3 due; HW4 assigned	Fels. IV.1-3
Mon	Oct 23	Kin and Group Selection		Fels. II.12, HC p. 560-569
Wed	Oct 25	Quantitative Traits		Fels. IX.1, HC chap. 8
Fri	Oct 27	Quantitative Traits	HW4 due	Fels. IX.4
Mon	Oct 30	Review session		
Wed	Nov 1	Midterm Exam		
Fri	Nov 3	Sex Ratio and Sex Determination	HW5 assigned	HC p. 555-560
Mon	Nov 6	Evolution of Sexual Reproduction		
Wed	Nov 8	Gene Families		
Fri	Nov 10	VETERAN'S DAY HOLIDAY	HW5 due; HW6 assigned	GL chapter 6, HC p. 284-405
Mon	Nov 13	Chromosomal Evolution		
Wed	Nov 15	Genome Evolution		GL chapter 8
Fri	Nov 17	Selfish DNA	HW6 due; HW7 assigned	GL chapter 7, HC p. 407-425
Mon	Nov 20	Competition Among Levels of Organization		
Wed	Nov 22	Species Concepts		
Fri	Nov 24	THANKSGIVING HOLIDAY	HW7 due; HW8 assigned	
Mon	Nov 27	Speciation		HC p. 586-603
Wed	Nov 29	Phylogeny		GL chapter 5
Fri	Dec 1	Phylogeny	HW8 due; HW9 assigned	
Mon	Dec 4	Coalescent Theory		
Wed	Dec 6	Cancer as an Evolutionary Process		
Fri	Dec 8	Review session	HW9 due	