

POPULATION GENETICS (BIO 4181), FALL 2009

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Your grade will be determined by problem sets (30%), an in-semester examination (30%), and a comprehensive final (40%). The textbook is *Population Genetics and Microevolutionary Theory* by Templeton. The reading assignments given below refer to this book. Additional readings may be assigned during the semester and will be placed on reserve in the biology library. Also on reserve in Olin Library is the textbook *Principles of Population Genetics* by Hartl and Clark as an alternative source of information. Past problem sets and supplementary material will be available at the website for the class: <http://www.nslc.wustl.edu/courses/Bio4181/bio4181.html>.

The TA's will lead evening discussion sessions (time and place TBA) on applications of population genetics every two weeks, and lead working groups on problem sets on an as needed basis. There will also be review sessions before the exams.

COURSE OUTLINE

DATE	TOPIC	READINGS
8-27	Scope and Premises of Population Genetics	Chapt. 1
I. Population Structure		
9-1	Hardy Weinberg	Chapt. 2
9-3	Systems of Mating I	Chapt. 3
9-8	Systems of Mating II	Chapt. 3
9-10	Genetic Drift	Chapt. 4
9-15	Neutrality and Molecular Evolution	Chapt. 5
9-17	Coalescence	Chapt. 5
9-22	Gene Flow & Subdivision I	Chapt. 6
9-24	Gene Flow & Subdivision II	Chapt. 6
9-29	mtDNA, Y-DNA: Separating History from Gene Flow	Chapt. 7
II. Genotype and Phenotype		
10-1	Quantitative Genetics: means	Chapt. 8
10-6	Quantitative Genetics: variances	Chapt. 8
10-8	The Unmeasured Genotype Approach	Chapt. 9
10-13	The Measured Genotype Approach	Chapt. 10
III. Selection		
10-15	Measures of Fitness & Constant Fitness Models	Chapt. 11
10-20	Selection on Quantitative Traits & FFTNS	Chapt. 11
10-22	Examination on Sections I & II	
10-27	Pleiotropy and Developmental Constraints	Chapt. 11
10-29	Interactions of selection with other evolutionary forces	Chapt. 12
11-3	The Shifting Balance Theory	Chapt. 12
IV. Units and Targets of Selection		
11-5	The Unit of Selection	Chapt. 13
11-10	Meiotic and Molecular Drive	Chapt. 13
11-12	Sexual, Frequency & Density Dependent Selection	Chapt. 13
V. Ecological Genetics		
11-17	Environmental Heterogeneity I	Chapt. 14
11-19	Environmental Heterogeneity II	Chapt. 14
11-24	Coevolution	Chapt. 14
12-1	Life History Evolution	Chapt. 15
12-3	Course Summary: the <i>aa</i> syndrome	Chapt. 15
12-11	Final Exam: 10:30 – 12:30 AM	