

Tentative Syllabus

GENE 612 – Population Genetics, Fall 2019 (sec 600) TR 8:00 am – 9:15 am, BSBW B25

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Office hours: by appointment

Text: *Genetics of Populations (Fourth Edition)*, Philip W. Hedrick (2011) ISBN-13: 978-0763757373. The text is required. There may be questions on exams or homework from readings that will not be covered in class.

Course Description and Prerequisites: Biological approach to genetic characteristics of populations dealing with genetic equilibrium, allelic variation, determination of genetic variation in populations, effects of mating systems, selection, mutation, gene flow and drift on population parameters. Prerequisites: GENE 603 and STAT 651 (or equivalent general introductions to genetics and statistics [covering probability, ANOVA, linear regression, etc.]).

Learning Outcomes: You will be able to: 1) Comprehend basic theory underlying the field of population genetics. 2) Identify, describe, and analyze the evolutionary mechanisms (mutation, genetic drift, selection, gene flow, and non-random mating) and their interactions that shape and/or create genetic diversity and structure within and among populations. 3) Use empirical methods and tools (e.g., software) to elucidate levels and patterns of genetic diversity and differentiation among populations and to infer and assess basic principles shaping population genetic structure. 4) Describe applications of population genetics to various fields such as forensics, molecular ecology, conservation biology, and of course, evolutionary biology.

Examinations and homework: There will be 2 exams (mid and end of semester). There will also be homework/computer assignments (most likely weekly). You will need access outside of class to a computer that uses Windows. See me ASAP if this is a problem.

Grades: Grading is based on 10% in-class participation and 90% of total earned points from homework/assignments, and tests. There will be 2 exams worth 100 points each and 12 homework assignments worth a total of 120 points. Total possible points = 320. The Final grade percentage distribution is 0-59 F, 60-69 D, 70-79 C, 80-89 B, 90-100 A. I do not round averages. **No extra credit will be given.**

Attendance and Make-up Exams: I will tell you everything you need to know to get a good grade in this class during the lectures. Hence, it is very important to attend class if you want to get a passing grade in this course. “The university views class attendance as an individual student responsibility.” Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at <http://student-rules.tamu.edu/rule07>." Make-ups will be given for University-approved absences. You will need written documentation that the absence is excused and will need to contact me to make arrangements as quickly as possible before or after the absence (**send me an email if you are sick and cannot show up on a day an assignment or test is due**).

eCampus: Course materials will be available on eCampus (<http://ecampus.tamu.edu/>). You will need your NetID account to log on (To activate a NetID account see <https://services.tamu.edu/netid-activate/>).

Americans with Disabilities Act Policy Statement: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek Complex on west campus or call 979-845-1637. For additional information, visit <http://disability.tamu.edu>.

Academic Integrity Statements: <http://aggiehonor.tamu.edu/>

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Title IX and Statement on Limits to Confidentiality: Texas A&M University and the College of Science are committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws provide guidance for achieving such an environment. Although class materials are generally considered confidential pursuant to student record policies and laws, University employees — including instructors — cannot maintain confidentiality when it conflicts with their responsibility to report certain issues that jeopardize the health and safety of our community. As the instructor, I must report (per Texas A&M System Regulation 08.01.01) the following information to other University offices if you share it with me, even if you do not want the disclosed information to be shared: Allegations of sexual assault, sexual discrimination, or sexual harassment when they involve TAMU students, faculty, or staff, or third parties visiting campus. These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In many cases, it will be your decision whether or not you wish to speak with that individual. If you would like to talk about these events in a more confidential setting, you are encouraged to make an appointment with the Student Counseling Service (<https://scs.tamu.edu/>). Students and faculty can report non-emergency behavior that causes them to be concerned at <http://tellsomebody.tamu.edu>.

The materials used in this course are copyrighted. This means all materials generated for this class, which include but are not limited to syllabi, lecture notes, lab manuals, quizzes, exams, answer keys, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy them or distribute them unless I expressly grant permission.

I reserve the right to alter the contents on this syllabus. Also, the timing of lectures may be different from the syllabus below, particularly later in the semester. I may move around, add or delete materials. I will notify the class of any changes during the lecture time period and provide any new information or updated syllabi on eCampus.

Tentative Class and Assignment Schedule

Aug 27	Lect 01	Introduction, History, Background Info	Ch1-H, Ch1-T, (Ap 1and 2)-T
Aug 29	Lect 02	Probability, Mendelian Genetics, Allele frequency estimation. HW01 given	
Sep 3	Lect 03	HW01 discussion, papers given Hardy-Weinberg, measures of genetic variation	Ch 2-H, CH 2-T, assigned references
Sep 5		Paper discussion, HW02 given	
Sep 10	Lect 04	HW02 discussion Relaxing HW Assumptions, 2 locus HWE (LD intro)	Ch 2-H, Ch2-T,(523-540, 581-587)-H
Sep 12		HW03 given	
Sep 17	Lect 05	HW03 discussion Inbreeding from nonrandom mating	Ch 8 (up to p 480)-H, Ch 3-T
Sep 19		HW04 given	
Sep 24	Lect 06	HW04 discussion Systems of inbreeding, Inbreeding & LD, Assortative mating. HW05 given	Ch 8 (up to p480)-H, Ch 3-T, (547-549, 516-523)-H
Sep 26			
Oct 1	Lect 07	HW05 discussion, papers given Special Topics: extended HWE probabilities, clonality, estimating selfing. HW06 given	(492-499)-H, assigned references, (461-464)-H
Oct 3			
Oct 8		HW06 discussion, paper discussion	
Oct 10		Exam 1	
Oct 15	Lect 08	Basic selection models HW07 given	Ch 3 (111-148)-H, assigned reference
Oct 17			
Oct 22	Lect 09	HW07 discussion, paper discussion (if time) Selection with multiple alleles, selection and LD, and selection with inbreeding. HW08 given	(149-153)-H, (343-358)-T (552-562)-H, (499-512)-H
Oct 24			
Oct 29	Lect 10	HW08 discussion Genetic Drift	Ch 4-H
Oct 31		HW09 given	
Nov 5	Lect 11	HW09 discussion Drift and LD, Effective population size, Drift with selection or non-random mating, HW 10 given	Ch 4-H, (540-543)-H, assigned references
Nov 7			
Nov 12	Lect 12	HW10 discussion, paper discussion (if time) All things Mutation	Ch 5-H, (512-515)-H, (543-546)-H
Nov 14		HW11 given	
Nov 19	Lect 13	HW11 discussion Gene Flow/Population Structure	CH 7-H, (549-552)-H
Nov 21		HW 12 given	
Nov 26	Lect 14	HW12 discussion Coalescence/Molecular Evolution	CH 6-H, CH 5-T, (563-581)-H
Nov 28		Thanksgiving	No class
Dec 3	Lect 14	Coalescence/Molecular Evolution	
Dec 9		Final Exam -- Exam 2	1:00 pm – 3:00 pm