

**Conservation Genetics WFSC/GENE 633**  
**Spring 2020**  
**Course Syllabus**

The purpose of this course is to provide students with a review of genetic concepts and techniques that are relevant to the management and conservation of biological diversity. After this course, students are expected to critically examine research and conservation strategies within a conservation genetics framework. The format of the course includes lectures and student presentations/discussions.

**Instructor:**

Dr. Luis Hurtado  
Dept. of Wildlife and Fisheries Sciences  
lhurtado@tamu.edu  
Office Hours by appointment.

**Level = 6**

**Prerequisites:**

An introductory course in general genetics and/or a course related to ecology or biological conservation.

**Course credit:**

3 semester hours, based on 3 one-hour lectures per week.

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3 semester hours, based on 3 one-hour lectures per week.

**Textbook:**

Allendorf F. W., Luikart G. H., Aitken S. N. (2013). Conservation and the Genetics of Populations. 2nd Edition. 630 pp. John Wiley & Sons. Somerset, NJ, USA

Access through the library:

<http://site.ebrary.com/lib/tamu/docDetail.action?docID=10608188>

**Other material:**

Frankham R., Ballou J. D., and D. A. Briscoe (2010). Introduction to Conservation Genetics. Cambridge University Press.

Hartl D. L., and G. C. Clark (2007). Principles of Population Genetics. Sinauer Associates.

Papers from relevant journals such as Conservation Genetics, Molecular Ecology, Genetics, Marine Biology, etc., will be discussed.

## **Tentative Schedule of Lectures (Subject to change)**

### **Lecture 1**

Introduction (Chapter 1)

### **Lecture 2**

Phenotypic variation in natural populations (Chapter 2)

Student-led discussions of journal articles: morphological variation/countergradient variation, fluctuating asymmetry; behavior

### **Lecture 3**

Genetic variation in natural populations (Chapters 3)

Student-led discussions techniques (RAD-sequencing, transcriptomicsDNA)

### **Lecture 4**

Genetic variation in natural populations (Chapter 4)

Student-led discussions techniques (metagenomics, genomics, eDNA)

### **Lecture 5**

Random mating populations: the Hardy-Weinberg principle (Chapter 5)

Student-led discussions of journal articles

### **Lecture 6**

Small populations and genetic drift (Chapter 6)

Student-led discussions of journal articles

### **Lecture 7**

Effective population size (Chapter 7)

Student-led discussions of journal articles

### **Lecture 8**

Pre-proposal presentations

### **Lecture 9**

Natural Selection (Chapter 8)

Student-led discussions of journal articles

### **Lecture 10**

Population subdivision (Chapter 9)

Student-led discussions of journal articles

### **Lecture 11**

Multiple loci (Chapter 10)

Student-led discussions of journal articles

### **Lecture 12**

Quantitative genetics (Chapter 11)

Student-led discussions of journal articles

**Lecture 13**

Mutation (Chapter 12)

Student-led discussions of journal articles

**Lecture 14**

Inbreeding depression (Chapter 13)

Student-led discussions of journal articles

**Lecture 15**

Demography and extinction (Chapter 14)

Student-led discussions of journal articles

**Lecture 16**

Metapopulations and fragmentation (Chapter 15)

Student-led discussions of journal articles

**Lecture 17**

Units of conservation (Chapter 16)

Student-led discussions of journal articles

**Lecture 18**

Hybridization (Chapter 17)

Student-led discussions of journal articles

**Lecture 19**

Exploited populations (Chapter 18)

Student-led discussions of journal articles

**Lecture 20**

Conservation breeding and restoration (Chapter 19)

Student-led discussions of journal articles

**Lecture 21**

Invasive species (Chapter 20)

Student-led discussions of journal articles

**Lecture 22**

Climate change (Chapter 21)

Student-led discussions of journal articles

**Lecture 23**

Genetic identification and monitoring (Chapter 22)

Student-led discussions of journal articles

**Lecture 24**

Project Discussions ('NSF panel-like' round Table)

**Lecture 25**

Final proposal presentations

Feedback / Final projects due

### **List of assignments, tests, etc.**

All students are expected to complete a comprehensive final paper, which includes a presentation; present at least one article each week; participate in lecture; and complete homework and quizzes.

### **Grading:**

Grades will be based on Final Paper (30%), presentation of final paper (10%), regular in-class presentations (20%), in-class participation (20%), homework and quizzes (10%), and editorial service (10%).

[91–100% = A; 81–90% = B; 71–80% = C; 61–70 = D; 60 or less = F]

### **Attendance:**

Attendance is obligatory. The format of the course involves a great deal of student participation through discussions and presentations. Furthermore, in-class participation represents a high percentage of the final grade. Two missing lectures without a valid justification will result in the loss of 10% of the final grade. Four missing lectures without a valid justification will result in the loss of 20% of the final grade. Additionally, the corresponding percentage of quizzes and homework due at the missing lecture will be reduced from the final grade. Missing more than four lectures without a valid university excused absence will result in an F grade for the course.

### **Final paper:**

Complete a grant proposal with the format of an NSF Doctoral Dissertation Improvement Grant.

See guidelines and related information in

[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5234&org=DEB](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5234&org=DEB)

The proposal should be on a conservation genetics study. It should include: (1) project summary (200 words); (2) a project description limited to 8 single-spaced pages including figures and tables (in our case we will do 8 pages); and (3) budget and budget justification for no more than \$15,000 for up to 24 months.

Important dates:

January 23: by this date the student should have met with me to discuss the grant topic.

**Failure to do so will result in a loss of 5% of the final grade.**

January 30: by this date the student should have sent me by email a 2-pages single-spaced pre-proposal and a list of at least 15 papers with the abstracts that will be used in the proposal. **Failure to do so will result in a loss of 5% of the final grade.**

February 6: First proposal presentations. **Failure to do so will result in a loss of 5% of the final grade.**

April 2: due date for the student to sent me by email the first draft of the proposal, which will be reviewed by another graduate student. **If the final paper is handed in at a later date it will result in a loss of 10% of the final grade.**

April 10: due date for the reviewers to send me their comments on the proposals.

April 21 and 23: presentation of proposal to the class. **Failure to do the presentation will result in a loss of 10% of the final grade.**

May 4: due date to send me a 'corrected' final version of the proposal. It should include a 1-2 page letter explaining how the comments of the editor were addressed. **If the corrected final paper is handed in at a later date it will result in a loss of 10% of the final grade.**

### **Weekly presentations**

Each lecture students will present individually findings of a paper related to the topic being reviewed. Presentations are ~20-30 minutes. A student can present more than one paper, but the duration of the student presentation should be maintained in no more than 30 minutes. **Failure to present in a given week will result in a loss of 5% of the final grade.**

### **Homework and quizzes**

Homework will be only accepted the following lecture after it was requested, as well as any take-home quizzes.

**Failure to return homework or take-home quizzes on time will result in loss of the corresponding percentage of the final grade.**

### **Americans with Disabilities Act (ADA) 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 the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.

### **Academic Integrity Statement**

***"An Aggie does not lie, cheat, or steal or tolerate those who do."***

Refer to the Honor Council Rules and Procedures on the web

<http://www.tamu.edu/aggiehonor>.