

Conservation Genetics (GENE 430)

Fall – 2015

Tues/Thurs 2:00-3:15pm ENR2 N350

Instructor: Erin Vaughn

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Office Hours: 12:00 pm - 1:30 am Tues. and Thurs and by appointment

Office: BSE 317

Course Prerequisites:

Although this course has no firm pre-requisites, you should have prior knowledge of basic genetic principles and theories. In particular, an understanding of Mendelian genetics as taught in MCB182 is recommended.

Course Description:

This course is offered to meet the needs of students working in conservation genetics and to provide a genetic perspective to students working in other areas of conservation biology such as wildlife management. This course will illustrate the application of evolutionary and genetic principles to promote the conservation, continued evolution, and long-term survival of free-ranging species. Topics will include: genetic diversity, quantitative genetic variation, natural selection, mutation, migration genetic drift, inbreeding, population fragmentation, population viability, taxonomy, and genetic management.

Course Philosophy and Goals:

Throughout this course you will be expanding your familiarity with the scientific method and its application in real world problems. Students will learn basic methods and theories of genetic analyses, which are employed in studies to aid in conservation and management decisions. Additionally, students will explore current genetic literature relevant to topics discussed. By completion of the course students should have a working knowledge of genetic

methods as they are applied to conservation questions, be able to interpret and evaluate conservation genetics literature, and be able to plan out a proposed research study to accomplish specific genetic objectives. Students will be held responsible for reading all assigned text prior to class and should expect to see exam questions related to topics covered only in the text. Group work is a major component of this course. To succeed in this course you will need to work harmoniously and manage your time in coordination with your group members.

Class Materials:

Required Text:

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

Optional Texts:

"Conservation Genetics: Case Histories from Nature" (1999) edited by John C. Avise and James L. Hamrick. Kluwer Academic Publishers

"Molecular Genetic Approaches in Conservation" (1997) edited by Tomas B. Smith and Robert K. Wayne. Oxford University Press

"Molecular Genetic Analysis of Populations, A Practical Approach" (1998) edited by A.R. Hoelzel. IRL Press

Class Requirements:

Exams: Two midterm exams and one final will be given. The exams are not cumulative in a traditional sense but the material for each section will build upon that from the previous section.

In-Class Group Worksheets: In-class worksheets, completed in groups, will be completed numerous times throughout the semester. You must participate in **10** worksheets over the course of the semester. To receive credit, your name must be included on the copy turned in to the instructor and you **MUST** be present in class. The entire group will lose credit for the worksheet if an absent student's name is included on the worksheet.

Journal Article Presentations: Over the course of the semester, you will present **TWO** journal articles to the class in a journal club-style powerpoint presentation format. A rubric for these presentations will be provided and the dates of your presentations will be scheduled during the first week of class. If you must reschedule your presentation, you must find another student with whom to exchange your date.

Original Research Plan: Your semester long project will be to draft an original research plan for a species of your choice. You may choose to model your research plan after an NSF (other appropriate funding source) grant.

Breakdown of Available Points:

3 exams	<i>150 points each</i>	450 points
10 in-class group worksheets	<i>10 points each</i>	100 points
Journal Article Presentations	<i>50 points each</i>	100 points
Research Plan		200 points
<i>Rough Draft</i>	<i>50 points</i>	
<i>2 Peer-Reviews</i>	<i>50 points each</i>	
<i>Final Draft</i>	<i>100 points</i>	
TOTAL		750 points

Course Grading:

A = 89.50% and higher (671 points or more)

B = 79.50% to 89.49% (596 to 670 points)

C = 69.50% to 79.49% (521 to 595 points)

D = 59.50% to 69.49% (446 to 520 points)

E = 59.49% and lower (445 points or less)

Class Policies:

Make-up Exams/Projects: Exams can be made up only if the instructor is contacted prior to the exam and/or a suitable form of documentation permitting the absence (doctor's note/police report/etc.) is provided. An alternative exam will be administered within 1 week of the missed exam in these cases.

Missed in-class work: As there are several more than ten opportunities to gain the available 100 points for in-class group work, no make-ups will be provided for these activities.

Late assignments: The term project is NOT something you can leave until the last minute. Illness or emergency is therefore not a valid excuse for incompleteness of the project components. Should documented illness or emergency prevent you from turning in a project component on time, you will lose 10% credit for every day late (after an initial 24 hour grace period). With this in mind, it is important to back up your documents so that they are safe in the event that your laptop is stolen/your internet connection crashes/your dog eats your homework.

Attendance and Withdrawl Policy: Students permanently leaving the course must file a "drop" or "withdrawal" form. Students must not assume that they will be dropped automatically for failure to attend class.

Special Needs and Accommodations: Students needing special accommodations or services should contact the SALT (Strategic Alternatives Learning Techniques) Center for Learning Disabilities (1010 N. Highland Ave.; PO Box 210021, Tucson, AZ 85721-0021, 520-621-1242, FAX 520-621-9448, TTY 520-626-6072), <http://www.salt.arizona.edu/>, or the Disability Resources Center- 1540 E 2nd Street, PO Box 210064, Tucson, Arizona 85721-0064, 520-621-3268 V/TTY FAX 520-621-9423, E-mail: uadrc@email.arizona.edu, web <http://drc.arizona.edu/>. The appropriate office must verify the need for special services or accommodations. Please provide verification no later than the second week of class so that I can help to provide the best learning environment possible.

Academic Integrity: Students are encouraged to share ideas and skills and to freely

discuss the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless instructed otherwise. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA - General Catalog.

Subject to Change: This syllabus may be subject to change with reasonable advance notice.

Course Schedule:

Note: *All assignments are due at the beginning of class on the date specified.*

Date	Topic	Assigned Reading	Project Component Notes
Aug 27	Course Orientation		
Aug 29	Extinction	Chapter 2	
Sept 3	Genetic Markers	Chapter 3	
Sept 5	Characterizing Diversity	Chapter 4	
Sept 10	Journal Club Day 1		
Sept 12	Quantitative Genetic Variation	Chapter 5	
Sept 17	Natural Selection & Drift	Chapters 6 & 9	
Sept 19	Mutation & Migration	Chapter 7	
Sept 24	Journal Club Day 2		
Sept 26	Midterm Exam 1		
Oct 1	Population Size	Chapter 8	
Oct 3	Effective Population Size	Chapter 11	
Oct 8	Inbreeding	Chapter 12	
Oct 10	Inbreeding Depression	Chapter 13	
Oct 15	Journal Club Day 3		
Oct 17	Population Fragmentation	Chapter 14	
Oct 22	Genetically Viable Populations	Chapter 15	
Oct 24	Phylogeography	Chapter 16	
Oct 29	Journal Club Day 4		

Oct 31	Midterm Exam 2		
Oct 31	Peer Review Process Discussion		
Nov 5	Genetic Management	Chapter 17	Rough Draft DUE
Nov 7	Invasive Species	Chapter 20	
Nov 12	Forensics	Chapter 21	Rough Draft Returned
Nov 14	Journal Club Day 5		
Nov 19	Advanced topics in Genomics		
Nov 21	Bioinformatics Lab I		
Nov 26	Bioinformatics Lab 2		Final Draft DUE
Nov 28	Thanksgiving – NO CLASS		
Dec 3	Journal Club Day 6		
Dec 5	Peer Review Day 1		
Dec 10	Peer Review Day 2		
Dec 19	Final Exam		