Instructor Information:
Bjorn Schmidt
Office: STC 212
Email: bjorn.schmidt@tamuc.edu
Preferred contact: email
Virtual office hours: 9-5 M-F, scheduled by appointment through email

Textbook (main textbook source, only using Chs. 4-8):

This textbook is listed as required, because it is recommended as a companion reading text to powerpoints for optimal learning, but we will only be using Chs 4-8 (microevolution sections).

All quiz and exam content will come fully from powerpoints.

Reference Textbooks (not required, but will be using some material from these sources for powerpoints)


Course Description
Ecological genetics is a hybrid field used to describe ecological influences on genetic variation within and between populations. Ecological genetics is comprised of aspects from the fields of spatial ecology, population genetics, and evolution. Ecological genetics primarily investigates drivers and interactions of short-term genetic change in variation in populations (microevolution). The course will encompass background reviews of mendelian and population
genetics, patterns of phenotypic and genetic variation, genetic mutation, genetic drift, gene flow, genetic differentiation and population structure, natural selection, quantitative genetics, artificial selection, and patterns and techniques of landscape genetics. Ecological genetics is primarily a research field, so a component of the class will be spent examining how concepts detailed in the course are applied in peer-reviewed literature provided by the instructor.

Student Learning Outcomes
- Students will understand the sources, implications of, and influences on genetic variation in natural populations
- Students will be able to conceptualize microevolutionary processes through a population genetics framework
- Students will understand the four microevolutionary forces that cause genetic change in populations, their effects, and their interactions
- Studies will understand patterns and differences in selection patterns on genotypes and quantitative phenotypic traits
- Students will understand research applications of ecological genetics and know common genetic measurements of populations and measurements of gene flow between populations
- Students will understand how ecological factors promote or restrict gene flow between populations in plants, terrestrial animals, and aquatic organisms

Course Materials and Online Presentation
All course materials will be presented through d2l. The class format will be asynchronous, following the schedule that appears later in the syllabus. Lecture videos and corresponding powerpoint slides will be uploaded to d2l. Virtual office hours for the course are available by appointment for opportunities to ask questions about the course or topics covered in the course. Questions will also be responded to promptly through email (within 24 hours). There will also be periodic quizzes, paper reports, and exam for assessment.

Course Evaluations
Tests: There will be a comprehensive final exam
Quizzes: There will be 4 quizzes posted on Fridays covering topics from powerpoint lectures
Paper Reports: There will be 5 paper reports that will be done on peer-reviewed papers posted to d2l on specific Wednesdays (dates for paper reports are posted in the schedule below). Each report will be approximately two-three pages long. Specific instructions for the reports and grading criteria will be posted in d2l with the posting of the first research paper.
Participation: There will be points awarded for participation. The total points will be awarded based on attendance (viewing powerpoint lectures) and completion of paper reports and quizzes.

Grading
A: 89.96-100%
B: 79.96-89.95%
C: 69.96-79.95%
Evaluation Points
Final exam - 100 points
4 quizzes – 100 points (quiz 1 = 10 points, quizzes 2-4 = 30 points each)
5 paper reports – 150 points (30 points each)
Participation – 50 points

Total points = 400

Online Attendance: You are expected to keep up with all of the online course materials provided each week. Attendance will be assessed each week through logging onto d2l and interacting with powerpoints, videos, quizzes or paper report files. Because this is a summer course, the content schedule each week is tight, so please try not to fall behind as it will be difficult to catch up in later weeks.

General Makeup Policy: The student is responsible for requesting a makeup when they are unable to submit the regularly scheduled assessment and must schedule the makeup within 3 days after the due date. If the assessment is not made-up, the student will receive a zero for that item. Note: makeups for the final exam and items due on 07/08 will not be available as final grades will need to be calculated on 07/09, if you have extenuating circumstances for the final or other materials at the end of the summer semester, please contact me by email.

General Course Outline

- Lecture videos and slides for the corresponding week’s topics will be published on d2l under the content tab, generally on Mondays, Wednesdays, and Fridays.

- Quizzes will be posted on Fridays under the activities:quizzes tab in d2l and will be due the following Thursday before 11:59 pm (note there is no quiz for the last week, week 5, and quiz 1 is shorter and covers fewer topics than the other quizzes; quiz 1 will be worth 10 points, all other quizzes are worth 30 points)

- Specific topics covered in weekly quizzes are indicated in the topic schedule below

- Peer-reviewed research papers for paper reports will be available under the content tab (generally posted on Wednesdays), and completed paper reports will need to be submitted by the due date in the assignments tab, which is generally one week later (please use doc, docx, or pdf format for your submission)

- The final exam will be available under the activities:quizzes tab in d2l; the exam will be available for two days on 07/07 & 07/08
- Virtual office hours can be scheduled by appointment for 9am - 5pm M-F by email request; other specific questions or concerns can be answered by email.

- Reading assignments are companion readings to help with understanding of key concepts, all quiz and exam material will be drawn from powerpoints.

**Course Schedule:**

**week 1 – 06/07**

**Reading Assignment** for week 1 - Ch 4: Mutation & Variation

*Fri 06/11: Quiz 1 posted (covers topics 2-5): due 11:59 pm on 6/17*

**Week 1 topics:**

**Monday:** **Powerpoint 1 (topics 1-3)**
1) Syllabus/Welcome
2) What is Ecological Genetics?
3) Basic Genetics Review

**Wednesday:** **Powerpoint 2 (topics 4-5)**
4) Phenotypic and Genotypic Variation in Species and Populations
5) Microevolution Overview

**Friday:** **Powerpoint 3 (topics 6-8)**
6) Genetic Markers and Alleles
7) Quantitative Allele Frequencies, Random Mating, and Hardy-Weinberg Equilibrium
8) Non-Random Mating

**week 2 – 06/14**
Reading Assignment for week 2 - Ch 7: Genetic Drift: Evolution at Random & Ch 8: Evolution in Space (½ chapter)

*Fri (06/18): Quiz 2 posted (covers topics 6-13): due 11:59 pm on 6/24

Week 2 topics:

Monday: Powerpoint 4 (topics 9-10)
9) Genetic Mutation
10) Mutation Rates & Effects of Mutations

Wednesday: Powerpoint 5 (topics 11-13)
11) Genetic Drift
12) Effective Population Size, Genetic Bottlenecks, and Founder Effects
13) Drift and Genetic Variation

Friday: Powerpoint 6 (topics 14-16)
14) Gene Flow, Populations & Metapopulations
15) Factors Influencing Dispersal Rates
16) Measurements of Genetic Diversity in Populations & Individuals

week 3 – 06/21

Reading Assignment for week 3: Ch 8: Evolution in Space (remaining ½ chapter) & Ch 5: The Genetical Theory of Natural Selection

*Fri (06/25): Quiz 3 posted (covers topics 14-22): due 11:59 pm on 6/24

Week 3 topics:

Monday: Powerpoint 7 (topics 17-19)
17) Genetic Differentiation & Subdivision
18) F-statistics
19) Isolation by Distance

**Wednesday: Powerpoint 8 (topics 20-22)**
20) Natural Selection & Adaptations
21) Phenotypic Selection Patterns
22) Genotypic Selection Patterns

**Friday: Powerpoint 9 (topics 23-24)**
23) Other Selection Patterns
24) Synthesis & Interaction of 4 Microevolutionary Forces

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**week 4 – 06/28**

*Reading Assignment* for week 4 - Ch 6: Phenotypic Evolution

*Wed (06/30): Paper reports 3, 4, and 5 posted: due 11:59 pm on 7/08

*Fri (07/02): Quiz 4 posted (covers topics 14-30): due 11:59 pm on 07/08

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**Week 4 topics:**

**Monday: Powerpoint 10 (topics 25-27)**
25) Quantitative Genetics
26) Artificial Selection & Selective Breeding
27) Quantitative Trait Locus (QTL) Mapping

**Wednesday: Powerpoint 11 (topics 28-30)**
28) Isolation by Environment
29) Landscape Effects on Genetic Variation
30) Isolation by Resistance & Barriers to Gene Flow

**Friday: Powerpoint 12 (topics 31-32)**
31) Direct & Indirect Measures of Gene Flow
32) Genetic Clustering Statistical Tests

**week 5 – 07/05**

** Wed (07/07): Comprehensive Final Exam (covers topics 2-35) - posted 9 am on 07/07, due by 11:59 pm on 07/08

** Week 5 topics: **

** Monday: Powerpoint 13 (topics 33-35)**
33) Landscape Genetics in Plant Populations
34) Landscape Genetics in Terrestrial Animals
35) Waterscape Genetics

**Technology Requirements**

**LMS**

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
[https://community.brightspace.com/s/article/Brightspace-Platform-Requirements](https://community.brightspace.com/s/article/Brightspace-Platform-Requirements)

LMS Browser Support:
[https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm](https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm)

YouSeeU Virtual Classroom Requirements:
Access and Navigation
You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Communication and Support
If you have any questions or are having difficulties with the course material, please contact your Instructor by email.

Technical Support
If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

Syllabus Change Policy
The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced.

University Specific Procedures

Student Conduct
All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook, http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: Netiquette http://www.albion.com/netiquette/corerules.html

TAMUC Attendance
For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

**Academic Integrity**
Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

*Undergraduate Academic Dishonesty 13.99.99.R0.03*


*Graduate Student Academic Dishonesty 13.99.99.R0.10*

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

**ADA Statement**

*Students with Disabilities*
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 have a disability requiring an accommodation, please contact:

*Office of Student Disability Resources and Services*
Texas A&M University-Commerce
Gee Library - Room 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu

Website: Office of Student Disability Resources and Services
http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

**Nondiscrimination Notice**
Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.