



BIO 234—Fundamental Evolutionary Biology

SCOTTSDALE COMMUNITY COLLEGE
and 2 + 2 partnership with
NORTHERN ARIZONA UNIVERSITY

Syllabus and Course Outline, Section # 25845

Spring 2023, 2nd 8-week session (March 22–May 12)

Instructor Contact

Instructor : Dr. John Nagy **Time** : W 4:00—5:45
Office : NS 113 **Lecture** : Asynchronous Online
Phone : (480) 423-6121 **Recitation** : Live, SL 109
email: john.nagy@scottsdalecc.edu or jdnagy@asu.edu

Office Hours:

Monday	Tuesday	Wednesday	Thursday	Friday
9:30-10:20 NS 113	10:00-11:00 Online	9:30-10:20 NS 113	10:00-11:00 Online	By App't

Course resources

- All course content will be delivered via the following online platforms:
 - *Website:* <https://faculty.scottsdalecc.edu/nagyteaching/bio-345/>
This is the main place to find the lecture content. All lectures, which consist of reading assignments, lecture videos and study guides, will be posted here.
 - *Canvas website:* [Sign in via MyMaricopa](#).
Quizzes, exams, and grades will be posted here. See below for details.
- **Tutor center:** We have an excellent, free tutoring service available online. [Click here for information about how to access the tutor center.](#)
- **Text (required):** Herron, J. C. and S. Freeman. 2014. *Evolutionary Analysis*. 5th ed. Pearson, Boston.
- **Calculator (required):** Must be a scientific calculator, able to calculate logarithms and exponentials. (TI-80 series allowed, but not required.)
- **Spreadsheet software (required):** Any standard spreadsheet package, like Excel, Numbers or Open Office Calc, will work, including free, online applications like Google Sheets.

Course Description

Lecture: 3 credits, 3 periods

Fundamentals of evolutionary theory including natural selection, adaptation, species concepts, speciation, extinction, basics of phylogenetics, molecular and population genetics, and the evolution of sex and sociality.

Prerequisites: A grade of “C” or better, or coenrollment in BIO182, or permission of the instructor.

Course Objectives

1. Explain and apply the scientific method to investigate biological phenomena.
2. Describe the history and principles of evolutionary theory.
3. Describe evolution by natural selection and adaptation.
4. Explain principles of heritability.
5. Compare genetic processes of mutation as sources of variation.
6. Analyze models of population genetics and dynamics.
7. Calculate changes in populations using Hardy-Weinberg Equilibrium.
8. Define and contrast molecular clocks, genetic drift, migration, and gene flow.
9. Describe models of speciation, extinction, diversification, and biogeography.
10. Interpret phylogenetic trees and evolutionary relationships.
11. Describe the evolution of sex and sociality.

College Policies

Students are responsible for the college policies included in the college catalogue and the student handbook. Links are available on Canvas in the introductory module.

Course Delivery, Grading Standards and Practices

1. **Lectures and recitation:** Readings form the heart of the course. Online lectures involve reading assignments from the textbook and an associated quiz (see next item). Each week we will have 3 or 4 lectures. Lecture and quiz material will be discussed in recitation, which meets once per week for an hour and 45 minutes. The recitation is not a formal lecture. Rather, we will discuss the readings as a group to make sure we’re comfortable with key points and skills.

2. Lecture Quizzes

<i>Number of quizzes</i>	: 26 (one for each lecture).
<i>Value</i>	: 200 points total (8 points each; lowest score dropped)
<i>Dates</i>	: See course schedule below.
<i>Format</i>	: Short answer and essay, online (Canvass)
<i>Material covered</i>	: One lecture only (see schedule).

Lecture quizzes are meant to help you solidify your understanding of the reading and prepare for lecture. Each quiz will be given online through canvass. They are due before 11:59 PM on the day indicated on the schedule (see page 7). No late quizzes will be accepted. **Completion of a quiz will earn at least 80% of the points.** The remaining 10% will be earned by accuracy of the answers to specific questions. Quizzes are required. If a student misses 3 quizzes they will be withdrawn from the course for failure to complete course requirements.

3. Lecture Examinations

<i>Number of examinations</i>	: 2.
<i>Value</i>	: 150 points each.
<i>Dates</i>	: See course schedule below.
<i>Format</i>	: Multiple choice, problems, short answer and essay.
<i>Material covered</i>	: Current material only (not comprehensive).

Exams focus on concepts developed in readings and recitations. Only a small portion of each exam will test your ability to memorize. Most questions are designed to test your ability to reason, synthesize ideas and solve problems. **There are absolutely no make-up examinations.** If a student misses an examination, that student will be assigned a failing grade and/or withdrawn from the course at the instructor's discretion for failure to complete the requirements of the course. During both examinations, students must abide by the examination rules as set out on the exam cover sheet and instructions from the proctor. If a student fails to abide by the rules of the exam, that student will earn zero points for that examination. The student would also face potential dismissal from class and the college with a permanent record of the infraction of the student's transcript. (See "Student Misconduct" section below.) Exams must be taken on the day indicated in the course schedule (see page 7), and must be completed before midnight on that day.

4. Grading Summary

Here is a summary of the total point breakdown in the course. These are the only points available—there are no extra credit assignments.

26 lecture quizzes	: 200 points
2 lecture examinations	: 300 points each
Total	: 500 points

5. Grading Scale and Procedures

Final grades are based on the final score applied to the following scale:

Final Score	% of Total	Grade
450-500	90-100	A
390-449	78-89	B
330-389	66-77	C
250-229	50-65	D
< 250	< 50	F

Remarks and further information

1. Important Dates:

<i>Last day to withdraw with refund</i>	: March 27
<i>Restricted withdrawal with 'W' ends</i>	: April 12
<i>Restricted withdrawal ends</i>	: May 1
<i>Final exam</i>	: May 12 before midnight (online)

2. Completion policy:

Students are required to complete all quizzes and exams for full credit. Any student who fails to submit more than 3 quizzes or 1 exam will be withdrawn for lack of participation at the instructor's discretion.

3. Withdrawal policy:

The following are official policies of the college.

- Students may initiate an official withdrawal from any course by submitting a withdrawal form with required signatures to the Admissions and Records office within the published deadline dates.
- Failure to attend any classes is not a guarantee for a refund or an excuse of debt incurred through registration. See "Refund Policy" in the College Catalogue, available from a link on this course's Canvas site.
- Official date of withdrawal is the last date of attendance as determined by student's withdrawal or as reported by the instructor.
- The official date of withdrawal will determine degree of refund, if any.
- Failure to file official withdrawal form within published deadlines can result in a failing grade and may affect refund of course tuition and fees.
- Additional information on withdrawals can be found in the College Catalogue.
- Upon request, the instructor will withdraw a student through the first 10 weeks with a grade of "W." After the 10th week, the instructor will withdraw the student with a grade of "Y" unless the student is passing at the official time of withdrawal. Withdrawals will not be issued after the date identified as the "deadline for students to withdraw from a course" indicated in the SCC General Catalogue (2 weeks before the last lecture).

4. **Incompletes:** A grade of “I” may be assigned at the end of the semester to a student who has completed at least 80% of the required coursework, is passing, and is unable to complete the remaining coursework due to illness or other circumstances beyond the student’s control. If approved by the instructor, the student and instructor will fill out the Incomplete contract, which will specify the work that needs to be done and the deadline for completion (not to exceed 7 months). A student WILL NOT re-register for the class in order to remove the grade of “I.”
5. **Student misconduct policy:** The classroom is an educational learning environment where students are expected to engage in behaviors which are conducive to their own learning and the learning of their peers. To facilitate this, respect for self and others is mandatory and necessary. Should a student exhibit disruptive behavior and/or use profane language to the extent that it interferes with the learning environment, an academic consequence may be imposed. Any student found by a faculty member to have committed academic misconduct may be subject to the following academic consequences:
 - **Warning**—A notice in writing to the student that the student has violated the academic code.
 - **Grade Adjustment**—Lowering of a score on a test or assignment.
 - **Discretionary Sanctions**—Additional academic assignments determined by the faculty member.
 - **Course Failure**—Failure of a student from a course where academic misconduct occurs. Further information can be found in the SCC Student Handbook, Academic Misconduct available from the course Canvas page.
6. **Academic honesty:** Cheating, including but not limited to copying another student’s work on any assignment or test and plagiarism of published literature, cannot be tolerated. With one exception a first offense will result in earning 0 points for the associated exam/quiz/assignment and a report to the Vice President of Academic Affairs. The exception is the final examination. If a student cheats on the final or commits a second offense, that student will be assigned a failing grade (F) for the course and a recommendation to the VP of Academic Affairs to enact the policies outlined in the College Catalog.

Academic dishonesty is defined in the current SCC College Catalog as the following:

- **Academic misconduct**—includes any conduct associated with the classroom, laboratory, or clinical learning process that is inconsistent with the published course competencies/objectives and/or academic standards for the course, program, department, or institution. Examples of academic misconduct include, but are not limited to: (a) cheating and plagiarism (including any assistance or collusion in such activities, or requests or offers to do so); (b) excessive absences; (c) use of abusive or profane language; and (d) disruptive behavior.
- **Cheating**—any form of dishonesty in an academic exercise. It includes, but is not limited to, (a) use of any unauthorized assistance in taking quizzes, tests, examinations, or any other form of assessment whether or not the items are graded; (b)

dependence upon the aid of sources beyond those authorized by the faculty member in writing papers, preparing reports, solving problems, or carrying out other assignments; (c) the acquisition, without permission, of tests or other academic material belonging to or administered by the college or a member of the college faculty or staff; and (d) fabrication of data, facts, or information.

- **Plagiarism**—a form of cheating in which a student falsely represents another person's work as his or her own. It includes, but is not limited to: (a) the use of paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; (b) unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials; and (c) information gathered from the internet and not properly identified.

7. **Academic and student support services:** A variety of student services can be accessed online. Services are free of charge to all registered SCC students. Refer to the SCC College Resources Student Home Page (www.scottsdalecc.edu/college-resources).
8. **Accommodations:** Scottsdale Community College provides equal opportunity to qualified students. If you have a documented disability (medical, physical, learning, psychological, etc.) and wish to request disability-related accommodations to complete course requirements, contact Disability Resources and Services (located in SC building; 480-423-6517). Course requirements cannot be waived, but reasonable accommodations may be provided based on disability documentation and course objectives.

Students are responsible for the information contained in this syllabus. The information in this syllabus is subject to change based on the discretion of the instructor.

Course schedule

Week	Lesson	Title	Due Date*
1	Unit 1	Introduction to Evolution	
March 20 –	1.1	Syllabus & Introduction	3/23 (Thurs)
March 24	1.2	Evidence for microevolution & speciation	3/24 (Fri)
2	1.3	Evidence for macroevolution	3/27 (Mon)
March 27 –	1.4	Artificial and natural selection	3/28 (Tues)
March 31	1.5	Reading evolutionary trees	3/30 (Thurs)
	1.6	Phylogeny reconstruction	3/31 (Fri)
3	Unit 2	Mechanisms of Evolution	
April 3 –	2.1	Causes and consequences of genetic variation	4/3 (Mon)
April 7	2.2	Models of natural selection	4/4 (Tues)
	2.3	Theory of natural selection	4/6 (Thurs)
	2.4	Mutation-selection balance	4/7 (Fri)
4	2.5	Genetic drift	4/10 (Mon)
April 10 –	2.6	Neutral theory and inbreeding	4/11 (Tues)
April 14	—	Midterm examination	4/14 (Fri)
5	Unit 3	Adaptation	
April 17 –	3.1	Quantitative genetics	4/18 (Tues)
April 21	3.2	Methods for studying adaptation	4/20 (Thurs)
	3.3	Sexual selection	4/21 (Fri)
6	3.4	Evolution of social behavior	4/24 (Mon)
April 24 –	3.5	Life history evolution	4/25 (Tues)
April 28	3.6	Evolutionary medicine	4/27 (Thurs)
	3.7	Comparative evolution of genomes	4/28 (Fri)
7	Unit 4	History of Life on Earth	
May 1 –	4.1	Origin of life on Earth	5/1 (Mon)
May 5	4.2	Speciation	5/2 (Tues)
	4.3	Evolution in the Precambrian	5/4 (Thurs)
8	4.4	Evolutionary transitions: sea to land	5/8 (Mon)
May 8 –	4.5	Evolutionary transitions in the Mesozoic	5/9 (Tues)
May 12	4.6	Evolutionary transitions: Human origins	5/11 (Thurs)
	—	Final examination	5/12 (Fri)

*Focus questions and exams must be completed by 11:59 PM on the date listed.