

Biology 270, Sec. 2, Principles of Evolution, Fall 2022

Course overview

Faculty	Peter Zani, Ph.D.
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Lecture	Tuesday, Thursday 11:00–12:15, CBB 135
Lab	Wednesday 9:00–11:00, TNR 461
Additional Help Hours	Mon. 1:00-1:50 pm, Tues. 10:00-10:50 am, Wed. 11:00–11:50, or by appointment as needed

Course description

An integration of molecular, cellular, organismal, and evolutionary processes involved in generating and maintaining biodiversity. Scientific communication emphasized in lab via writing and presentation assignments.

Course goals

Upon completion of this course you should be able to:

Apply knowledge of evolutionary processes that operate at the level of the genotype, organism, population, or species to explain patterns of species distribution and abundance.

Generalize how micro- and macro-evolutionary processes are responsible for historical and contemporary patterns of biological diversity within and among species.

Demonstrate the ability to write and orally present biological information that is articulate and grammatically correct with properly organized and documented data and ideas.

Critique your own and others' writing and oral communication skills by providing and applying useful feedback.

Course readings

Evolutionary Analysis 5th edition by Herron and Freeman (2014, Pearson, ISBN: 978-0-321-61667-8)

Writing in the Biological Sciences by Hofmann (2013, Oxford University Press, ISBN: 978-0-19-976528-7)

Course evaluation

Your grade in this course will be based on the following components totaling 320 pts:

Pre-Discussion Worksheets	In-Lecture Discussions	Lab Assignments	Research Paper & Poster	Lecture Exam 1	Lecture Exam 2
40	40	40	100	50	50
(8x5 pts. ea.)	(8x5 pts. ea.)	(8x5 pts. ea.)	(50 pts ea.)		

Discussions

We will periodically discuss scientific literature meant to integrate course material. Assignments will be posted to Canvas. Participation during discussions will be assessed based on a 5-point pre-discussion exercise and a 5-point in-lecture **group exercise** for a total of 80 points (25%). To receive discussion points you **MUST** submit pre-discussion assignments to Canvas **BEFORE** discussions. Pre-discussions are **individual** exercises to prepare you for the in-person **group** discussion. Discussions should be completed in groups of at least three students; individually-completed discussions will not be accepted (unless as approved make-up assignment). The goal is to work with others to understand certain aspects of each paper, usually a table or figure illustrating some central concept. You should expect that the ideas related to these central concepts will appear on the next exam via additional interpretation questions.

Labs

During the first half of the semester, labs consist of weekly exercises you can complete on your own or in groups. Due dates for all lab assignments are indicated on the class schedule (below). In-lab exercises during the first half of the semester are 5 points each and are worth a total of 40 points (13%). The other component of lab grades relates to the semester-long research projects and includes posters, oral presentations, and final written scientific reports. Lab-related communication will make up 31% of your total grade (100 points).

Exams

There are two in-term lecture exams (50 points each; 16% of your grade *each*). Exams will test your mastery of the material and your ability to apply critical-thinking/communication skills. Exam questions are meant to synthesize knowledge, meaning they lean **heavily** on short-answer/essay questions. Exams will also have questions from **each** in-class discussion that focus on the data and interpretation from that paper's figures. In-term exams are NOT cumulative, though the ideas definitely build in this course. Exams are take-home and will be assigned upon completion of discussions immediately preceding each exam (given out Tuesday, due the next Tuesday). There is no stand-alone final exam.

Grades

Your final grade is based on the percentage of points that you earn.

≥93% = A, ≥90% = A-, ≥87% = B+, ≥83% = B, ≥80% = B-, ≥77% = C+, ≥73% = C, ≥70% = C-, ≥67% = D+, ≥60% = D, <60% = F

REQUESTS FOR EXTRA POINTS WILL NOT BE HONORED.

Make-Up Assignments

You must make every effort to complete assignments at the scheduled times. MAKE-UP ASSIGNMENTS, INCLUDING EXAMS, MAY BE ALLOWED IN CASES OF MEDICAL EMERGENCY, FOR WHICH YOU MUST PROVIDE WRITTEN DOCUMENTATION. You must make arrangements with your instructor within 24 hours of the exam to schedule a make-up exam within one week or you will forfeit the points.

- An emergency is a situation where your presence is required to alleviate extreme suffering (including but not limited to your own), such as contracting Covid-19 from the novel coronavirus.
- Student Health Services does not handle emergencies.
- Scheduled appointments aren't emergencies.
- A good rule of thumb: *If your situation wouldn't cause you to postpone your wedding, then it isn't a good reason to miss a scheduled exam.*

Academic Integrity

Any misrepresentation of your work, including plagiarism, or cheating of any kind will result in a zero (0) for that assignment. Students are encouraged to become familiar with the UWS/UWSP Student Academic Standards and Disciplinary Procedures governing student academic conduct. This is available for download at:

<https://www.uwsp.edu/dos/Documents/UWSP14-Final2019.pdf>

- Copying whole passages written by someone else is plagiarism. Even if you right-click in Word to use the thesaurus and replace some words.
- Cobbling together sentence from various sources and presenting them as your own is plagiarism.
- Quoting passages is not appropriate in this class. Use your own words.

Disabilities

Students with disabilities are welcome and encouraged in this class. Students with disabilities should contact the Disability and Assistive Technology Center during the first two weeks of the semester if they wish to request specific accommodations.

<http://www.uwsp.edu/disability/Pages/default.aspx>

Classroom Conduct

Student and instructor behavior should promote an environment favorable to both teaching and learning. This mainly pertains to creating an environment that will not be disruptive for yourself or others. It is contingent upon you to participate in the required group exercises. In our discussions you are not required to agree with every opinion expressed by your instructors or your peers. In fact, healthy skepticism is expected of any good scientist. However, you must respect the rights of others to hold opinions different from your own. You are expected and encouraged to ask questions and participate in discussions (if a group member is not actually participating, feel free to let me know). Students that disrespect their classmates and their instructor by disrupting lectures or labs may be removed from online learning environments at the discretion of the instructor. When you are ready to engage in respectful discourse pertaining to your education, you will be welcomed back.

Teaching and Learning in the Era of Coronavirus

These are unusual times in that we are trying to continue teaching-and-learning while a very serious viral epidemic continues globally. Yet, we will persevere to overcome this challenge. In this case, the challenge is going to be meeting regularly to discuss the topic at hand and actually participating in the process. The primary work you can do on your own, but the scheduled meetings may aid you greatly. Moreover, I understand that life can get in the way of completing assignments. The key is open and honest communication. If you cannot attend meetings I can assign individual work, but this is much less ideal in that the group exercises are key to advance your understanding. If you become ill, I will make every attempt to pause the due dates on any assignments and allow for make-up work as needed. If something happens and you cannot meet, please try to let me know in advance so I can adjust as needed. So, am I flexible? Absolutely. Do I still have expectations for your education in this course? Absolutely. The key is, I am willing to work with you to ensure that you can master the learning outcomes of this course in a reasonable manner. Carry on and be safe.

Class Schedule (tentative)

Wk	Dy	Date	Lecture Topic	Lecture Readings	Lab Topic/ Suggested Readings
1	T	Sep. 6	Course introduction and syllabus		Topic choice due 1pm 9/9
1	R	Sep. 8	Evolutionary pattern & process	H&F 37-66	Getting started on the project
2	T	Sep. 13	Systematics and phylogenetics	H&F 109-26, 137-40	Project outlines (5pts) due 9am 9/21
2	R	Sep. 15	DISCUSSION 1: Phylogenies		
3	T	Sep. 20	Phylogeography		Phylogeography (5pts) due 9am 9/28
3	R	Sep. 22	Variation	H&F 147-61, 166-74	
4	T	Sep. 27	Hardy-Weinberg equilibrium	H&F 171-91	H-W equilibrium model (5pts) due 9am 10/5
4	R	Sep. 29	DISCUSSION 2: Natural variation		Hof: 100-04, 24-40
5	T	Oct. 4	Mechanisms: selection, mutation	H&F 73-94, 191-201, 216-19, 356-60	Modeling selection, mutation, drift (5pts)
5	R	Oct. 6	Mechanisms: migration, drift	H&F 234-39, 240-49, 257-59	due noon 10/12
6	T	Oct. 11	DISCUSSION 3: Selection		Modeling heritability (5pts) due 9am 10/19
6	R	Oct. 13	Heritability, fitness, adaptation	H&F 343-356	Hof: 3-21, 24-57
7	T	Oct. 18	Quantitative genetics	H&F 369-97	Lit. review & annotated biblio. (5pts)
7	R	Oct. 20	EXAM 1 due midnight 10/21		due 9am 10/26
8	T	Oct. 25	Life-history evolution	H&F 491-95, 513-29	Draft papers (5pts) due 9am 11/4
8	R	Oct. 27	DISCUSSION 4: Life-history evol.		Hof: 87-113, 146-64
9	T	Nov. 1	Evolution of behavior	H&F 455-86	
9	R	Nov. 3	DISCUSSION 5: Social evolution		
10	T	Nov. 8	Mechanisms of sexual selection	H&F 408-37	Peer reviews (10pts) due 9am 11/14
10	R	Nov. 10	DISCUSSION 6: Sexual selection		Hof: 119-22
11	T	Nov. 15	Species concepts & definitions	H&F 609-15	Poster design
11	R	Nov. 17	Modes of speciation	H&F 356-60, 616-37	Hof: 114-120, 193-204
12	T	Nov. 22	Mechanisms of speciation		No lab
12	R	Nov. 24	Thanksgiving, No classes		Thanksgiving
13	T	Nov. 29	DISCUSSION 7: Speciation		Paper revisions
13	R	Dec. 1	EXAM 2 due midnight 12/2		Individual meetings as needed
14	T	Dec. 6	Fossils & macroevolution		Final papers (50pts) due 9am 12/23
14	R	Dec. 8	Radiations	H&F 691-706, 719-30	
15	T	Dec. 13	Extinctions	H&F 707-19	Presentations (25pts) / Poster (25pts)
15	R	Dec. 15	DISCUSSION 8: Extinction		Poster presentations due 9am 12/23
16			There is no final exam in this class		