

BIOL4143-101/BIOL5143-101 Syllabus, Fall 2024

"Nothing in biology makes sense except in the light of evolution." (Dobzhansky)

Instructor Contact Information

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Office: Pierce Hall 213

Office Hours: M 1:00 – 3:00pm; T 12:00 – 2:00pm; W 8:00 – 10:00am

Course Overview/Description

Evolution and Systematics (3 credit hours) is the study of organic evolutionary processes, including mutations, genetic drift, patterns and rates of change, and how this knowledge is used to determine systematic relationships of taxa. Methods of systematic biology will be discussed. Prerequisite: BIOL3334 (Genetics) with a grade of C or better.

Course Learning Goals

Through active engagement and completion of course activities, students will learn:

- How evolution is the central theoretical explanation for all of life in all its diversity of form and function.
- How genetic variation is key to evolutionary success.
- How phylogenetics can be used to study the evolutionary relationships between organisms.

Course Materials

Technology: You will need to have access to a device that connects to the internet so that you can access email and D2L. All course details and materials will be posted on our D2L course site. Homework and assignments will be posted to D2L and you will submit your work to D2L. You are responsible for checking D2L every day to make certain you do not miss assignments or deadlines.

Slide Shows: PowerPoint slides for the course are on D2L. These slides represent figures from the textbook (see below). Because the figures are copyrighted, you are prohibited from redistributing these figures. You may print the slides for your own personal use, but you may not pass them on to other students once you are done with the course.

Readings: Slide shows are derived from *Evolution*, 5th edition (Douglas J. Futuyma and Mark Kirkpatrick). The 4th edition text has a different arrangement of chapters but can be substituted cheaper. Rental or purchase is fine. You need the textbook only (you do not need any ancillary electronic materials). All papers to be read for the journal article assignments will be posted in D2L. You may either print them or read them on your computer.

Coursework and Grading Scheme

This course is a 3-credit class. For every ONE (1) hour spent in class, you should expect to spend at least THREE (3) hours outside of class studying, reading, or completing assignments (for most students, this means 9 additional hours per week). Neither completing assignments the night before they are due nor cramming for exams the night before you take them are successful course prep strategies. Failure to adequately prepare for assignments and exams will result in poor grades in the class.

Students will be evaluated as follows.

| Assessment Category | % of letter grade (undergraduates) | % of letter grade (graduates) |
|---------------------------------|---|--------------------------------------|
| Exam 1 | 15% | 15% |
| Exam 2 | 20% | 15% |
| Comprehensive Final | 50% | 40% |
| Journal Article Assignments (3) | 15% | 20% |
| Term Paper | (not assigned) | 10% |

Grades will be assessed on the following scale (undergraduates and graduates will be assessed separately within their own cohort).

| | |
|---|------------------|
| A | 90.00% and up |
| B | 80.00 - 89.99% |
| C | 70.00 - 79.99% |
| D | 60.00 - 69.99% |
| F | 59.99% and below |

This is a reading-intensive course. I cannot cover everything in the course in excessive detail, so you will be required to read your textbook (or at least a textbook of some kind). Additionally, every student in this course (undergraduate AND graduate) must learn to read and understand the scientific literature and to be able to synthesize what they read. If you don't read, you won't do well in the course, so please put the effort in.

There is NO extra credit for this course. ALL grades (exams and assignments) count toward your final grade (there are no drops).

Course Policies

Attendance and Participation

All students are expected to **attend** all classes during the semester. It is recognized that students may need to miss class. As this is a TR class, 3 absences from regular classes are allowed. Excessive absences may lead to you being dropped from the course. You are not allowed to miss exams (see below) and absences do not preclude you from turning your assignments in on time. Attendance also means that you come to class ON TIME and do not wander in late or wander out part way through class to go to the bathroom, get a snack, play on your phone, etc.

Participation means that while you are in class, you are actually paying attention to the lecture, taking notes, and contributing to class discussions. This means you are NOT allowed to play on your phone, play on your computers, listen to music, have random conversations with others in class, sleep, or otherwise not pay attention.

Deadlines and Late Submissions

Assignment deadlines are listed in the course schedule. You are expected to adhere to these deadlines. However, life happens sometimes. So:

- You get one 'pass' to submit **one** journal article assignment up to 48 hours late without penalty.
- Beyond that, your grade for an assignment goes down 5% (off of your earned grade) for every 12 hours the assignment is late.

All assignments will be turned in electronically to a Dropbox set up for that purpose on D2L.

Academic Dishonesty and the Honor Code

Cheating, plagiarism, and collusion (as well as several other forms of conduct) are all strictly prohibited at MSU. Please read the MSU Student Handbook definitions of cheating, plagiarism, and collusion and MAKE SURE that you do not engage in any of these behaviors. If you are unclear on what may count as cheating, plagiarism, or collusion after reading the material below, please see the instructor or the Dean of Students. Cheating essentially means using unauthorized assistance on exams and assignments. Plagiarism means using another's work as your own without credit. Collusion involves collaborating with others in ways that are not authorized by the instructor. Any form of academic dishonesty will result in a zero for the assignment/exam.

Student Honor Creed: "As an MSU Student, I pledge not to lie, cheat, steal, or help anyone else do so." You should memorize this and live by it.

Course Policies for Use of Generative AI

Students are not allowed to use any form of Generative AI to aid them in completing assignments or exams. This includes, but is not limited to, ChatGPT, Chegg, GrammarlyGo, Bard, OpenAI, etc. While artificial intelligence (AI) tools can be valuable in certain contexts, in

this course it is important that students develop their own skills and abilities to research, think critically, and communicate without the use of this technology. To maximally gain from the intentionally designed learning experiences in the course, it will be crucial that all members of the course community rely on personal efforts rather than use of AI tools. All assignments should be written in your own words.

Mobile Devices

In class use of cell phones, headphones, and computers for purposes unrelated to course activities is NOT allowed (it is distracting to your neighbors, to me, and studies show that multi-tasking does not work).

Exam Policy

There will be 2 (**two**) midterm exams and 1 (**one**) comprehensive final. All exam dates are listed on the course schedule and will NOT be moved. **No make-up midterms will be offered to any person for any reason (I mean it—I do not care why you miss an exam, there are no make-up exams so DO NOT ASK FOR ONE).**

Students with a **legitimate, excusable reason** for missing a midterm will be given consideration. **A substitute score based on the final will be used to replace the zero received. Excusable reasons** for missing an exam include: a) extreme and verifiable illness (you must provide doctor/hospital verification; I will not simply take your word for it that you are too ill to attend); b) accident or injury (must present verification); c) MSU sanctioned event (active participant and you must have provided official university documentation **at least 2 class periods BEFORE** the exam); and d) extreme family emergency (e.g., funeral the day of the exam; **immediate family only**). **Inexcusable reasons** for missing an exam include: a) scheduling doctor, dentist, therapy or other appointments for the day/time of the exam (possible exception: court dates and imprisonment); b) failure to show up (this includes sleeping through the exam); c) weather (if MSU is open, then you must be here); d) congested exam schedule or overlapping classes; e) failure to obtain babysitter or caregiver; and f) work schedule conflict. **Students MUST notify me PRIOR to the start of the exam to receive consideration for an excused absence.** Notifying me after the exam will result in an unexcused absence. You only get 1 excused absence. Note: family trips, weddings, etc.—**if they were planned before the beginning of the semester**—will be considered on a case-by-case basis. Anything planned after the semester begins will not be excusable.

Absolutely no electronic devices of any kind may be used during exams, INCLUDING SMART WATCHES. All exams are closed book and will be monitored for cheating. If you are caught doing anything suspicious, your exam will be taken away from you and you will receive an automatic zero for the exam. NOTE: using old notes and exams from other students to prepare for this class is considered cheating and is not allowed. Copying your notes or exams to give to others either in or out of this class is considered cheating and is not allowed. Working in small groups for the purposes of skewing exam scores is considered collusion and is not allowed.

University Teams and Organizations

All members of **in-season sports** teams or other campus organizations who will be missing class because of university sanctioned events MUST present to me a written statement on university letterhead and signed by a university official indicating those dates that will be missed because of travel or participation in the university-sponsored event. Athletics documentation must be presented to me within the first 2 weeks of the beginning of the semester. Other documentation (such as for theater, etc.) must be presented to me at least one week prior to the time that will be missed. NOTE: if you KNOW you will be missing more than 3 classes during the semester, you MUST come talk with me the first week.

Services for 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 reasonable accommodation of their disabilities. Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. Students requiring accommodations should make application for such assistance through Disability Support Services, located in the Clark Student Center, Room 168, (940) 397-4140. The instructor then needs to be notified regarding any accommodations by an official letter obtained from DSS by the student and given to the instructor. **It is always the responsibility of the student to arrange accommodations with DSS.** Students with disabilities must still take their exams on the same day as the rest of the class. For more details, please go to Disability Support Services.

College Policies

Campus Carry Rules/Policies: Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Areas excluded from concealed carry are appropriately marked, in accordance with state law.

Smoking/Tobacco Policy: Smoking is prohibited on MSUTexas grounds, including buildings. Vaping is also prohibited.

Alcohol and Drug Policy: To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

Safe Zones Statement: The professor considers this classroom to be a place where you will be treated with respect as a human being regardless of gender, race, ethnicity, national origin, religious affiliation, sexual orientation, political beliefs, age, or ability. Additionally, diversity of thought is appreciated and encouraged, provided you can agree to disagree. It is the professor's expectation that ALL students consider the classroom a safe environment.

Instructor Drops: According to the MSU Student Handbook, "An instructor may drop a student any time during the semester for excessive absences, for consistently failing to meet class assignments, for an indifferent attitude, or for disruptive conduct." For the purposes of this course, "consistently failing to meet class assignments" includes consistently not turning in assigned work or turning in work that consistently receives a failing grade.

Intellectual Property: By enrolling in this course, the student expressly grants MSU a "limited right" in all intellectual property created by the student for the purpose of this course. The "limited right" shall include but shall not be limited to the right to reproduce the student's work product to verify originality and authenticity, and for educational purposes.

Best Practices for Course Learning

Learning how to learn effectively is a skill unto itself! To get the most out of this course, I recommend the following:

- If possible, attend all class meetings and be fully present and engaged.
- Read your textbook prior to coming to class.
- Take notes on what you read, either directly in the book or somewhere else, and jot down all of the questions you have.
- Test yourself on what you have read by trying to summarize key points without looking back at the text.
- Ask questions! Chances are, if you have a question, so does someone else.

Class Schedule (subject to change)

| Week | Days | Topic/Slide Show | Assignments |
|--------------|----------------|---|--|
| 1 | Aug 27 | Course Introduction 1 Evolutionary Biology | |
| | Aug 29 | 2 The Tree of Life | |
| 2 | Sept 3 | 2 (continued) | |
| | Sept 5 | 22 Statistics | |
| 3 | Sept 10 | 3 Natural Selection & Adaptation | |
| | Sept 12 | 4 Mutation and Variation | |
| 4 | Sept 17 | 4 (continued) 5 The genetical Theory of Evolution | Journal Article Assignment #1 DUE |
| | Sept 19 | 5 (continued) | |
| 5 | Sept 24 | 6 Genetic Drift | |
| | Sept 26 | EXAM 1: Slide Shows xx - xx | |
| 6 | Oct 1 | 6 (continued) 7 Phenotypic Evolution | |
| | Oct 3 | 7 (continued) 8 Evolution in Space | |
| 7 | Oct 8 | 9 Species and Speciation | |
| | Oct 10 | 9 (continued) | |
| 8 | Oct 15 | 9 (continued) 10 Evolution of Genes & Genomes | |
| | Oct 17 | 10 (continued) | |
| 9 | Oct 22 | 11 Evo Devo | Journal Article Assignment #2 DUE |
| | Oct 24 | 11 (continued) | |
| 10 | Oct 29 | 12 Sex | |
| | Oct 31 | EXAM 2: Slide Shows xx - xx | |
| 11 | Nov 5 | 12 (continued) | |
| | Nov 7 | 13 Cooperation & Conflict | |
| 12 | Nov 12 | 13 (continued) 14 Evolutionary Ecology: How to be Fit | |
| | Nov 14 | 14 (continued) 15 Evolutionary Ecology: Species | |
| 13 | Nov 19 | 15 (continued) | |
| | Nov 21 | 18 Biological Diversity | |
| 14 | Nov 26 | 18 (continued) 16 Phylogeny | Journal Article Assignment #3 DUE |
| | Nov 28 | THANKSGIVING - NO CLASS | |
| 15 | Dec 3 | 16 (continued) 30 Systematics | Graduate Student Term Papers Due |
| | Dec 5 | 30 (continued) | |
| FINAL | Dec 10 | FINAL EXAM (Comprehensive) 8:00 - 10:00am | |

Additional Expectations for Graduate Students

In addition to the above material (exams and journal article assignments), graduate students will receive one extra take-home question per exam that will test you beyond the level of the undergraduates and graduate students are expected to write a term paper. This term paper is to be short: minimally 4 pages (without references or pictures) and maximally 5 pages (without references or pictures). The reference sheet is extra (as are any figures). Text should be 11pt type, double spaced, standard 1-inch margins, with page numbers and NO cover sheet. Below are the requirements of the paper:

1. You are to **select ONE species** of interest (plant, animal, or microbial) and write about it from an evolutionary perspective. In your paper, you will include the following background information:
 - a. What is the classification hierarchy of your species (Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species)? Include any controversial elements to this classification and discuss what the scientific name (Genus species) refers to (how/why was it named the way it is). Remember, Genus names are capitalized, species names are lowercase, and both are italicized.
 - b. Where in the Tree of Life does your species fit? Which species or group of species is it most closely related to? Does this relationship make sense? Is it based on morphology or molecular biology?
 - c. Give a brief natural history of your species: Where does it live? How is it adapted to its environment? Is it symbiotic? Parasitic? What role does it play in its habitat? Is it threatened by climate change, humans, etc.?
2. You must **find ONE primary research article on your species that SPECIFICALLY addresses some aspect of the evolutionary biology** of the species you are writing about. This CANNOT be a review paper and it MUST be approved by me. This paper must be recent (within the last 2 years) and must be about evolutionary biology (evolution must be the main point of the paper).
 - a. You are to summarize this research paper as the core part of your term paper.
 - b. What aspect of evolution was examined? Why is it important? How does the research in the paper shape our understanding of that species? What methods in general were used? What was the research question and hypothesis? Do the data support the hypothesis or not?
 - c. You may NOT under any circumstances plagiarize, paraphrase, or quote from the papers you use for this assignment. All writing must be in your own words.
3. You will be graded on content, grammar/punctuation/spelling, and the quality of your writing. All references must be cited in your text. Failure to properly cite your sources will earn you a zero for the assignment.