

Midwestern State University
Spring Semester 2023
Ecology – BIOL-4684

Lecture: Tuesdays and Thursdays from 9:30 to 10:50 am (Bolin Hall 213)

Lab: Wednesday from 2:00 to 4:50 pm (McCoy Engineering Hall 207 and Bolin Hall 207)

Instructor of Record: Dr. Antonio R. Castilla (he/his/él)

Email (best way to contact me): antonio.castilla@msutexas.edu – expect an answer within 24hrs during the week and 48hrs in the weekends. Best way to get a timely answer: (1) Write the course name ('BIOL 4684') in the subject line, (2) use professional language, consider this professional correspondence, and (3) sign with your complete name. Do not expect a quick reply after 5pm, in the middle of the night or during weekends.

Office hours: Monday, Tuesday, Wednesday, Thursday, and Friday from 12:00 to 1 pm; or by appointment (email me to schedule a time).

Course content and goals

Ecology is the scientific study of the relationships between organisms and their environment, including interactions with the living and non-living features of an ecosystem. The primary goal of this course is to provide you with a basic introduction to the major areas within the field of ecology. Foundational concepts, central questions, and current knowledge in each area will be emphasized. There will also be a number of examples that will serve as mini-case studies for the course. Each of the different areas of ecology has potential application to one or more environmental issues, and thus the relevance of ecological research to conservation and policy will occasionally appear in the course. The overarching goal of this course is to train you to become an ecologist. You will acquire skills to critically evaluate and discuss the primary literature, develop a solid understanding of fundamental concepts in ecology, train your quantitative reasoning, and implement the scientific method through hands-on learning. A substantial portion of the course will be activity-focused, and you will learn not only from your instructors but also from your classmates and your own experience. To succeed, you will need to prepare for each class, which consists of reviewing your notes, reviewing assigned readings and videos, and completing assignments on time. You should allocate at least 9 hours per week outside the lectures and lab.

Suggestions to be successful:

- Take notes, take notes of your notes, summarize, and connect the material in new ways. Reviewing is not enough!
- Prepare for the class: read your notes, read the book chapters and the discussion papers, watch videos, and participate in class activities.
- Start your assignments early: don't leave things for the last minute.
- Ask questions! Ask all the questions. Ask me, ask your peers, ask me again.

By the end of the semester, you will be able to

- a) Understand the fundamental processes influencing the climates and biomes of the Earth.
- b) Relate the environmental conditions experienced by species with their adaptive traits.
- c) Use ecological information to predict the life strategies of species.
- d) Model population dynamics.
- e) Understand the different types of interactions that species experience.
- f) Analyze the composition and structure of ecological communities.
- g) Model the flow of energy and nutrients through ecosystems.
- h) Integrate information to understand the main challenges that global change is imposing to the conservation of global diversity.

Textbook, readings, materials, and resources

- **Required textbook:** Rick Relyea. *Ecology: The Economy of Nature*, 9th. Ed. W.H. Freeman & Company. ISBN 9781319245542. Although most of the course content is based on the ninth edition of this textbook, it is ok to use previous editions. Graded activities will focus on broader concepts beyond specific differences between editions.
- **Readings and lab handouts:** will be posted on D2L.
- **Additional resources:** I encourage you to look at additional sources and share them with everyone. If you are struggling with the lecture, discussions, or labs, looking at a different perspective may help.

Class structure

This course will be in-person and consist of five portions: Lectures, Critical Thinking, Quantitative Thinking, Teamwork, and Lab or Research Project. The instructor will set the pace of the course, including making deadlines for completing assignments. **Late submissions will not be accepted after the answers have been provided. If the answers have not been provided yet, a late submission will incur penalty points for lateness. Late assignments will have a penalty of 20% of the total points for each day late.**

All portions are designed to complement your knowledge and practice your skills in ecology, so topics will come up multiple times from different perspectives. You will have access to all materials via D2L. You must participate in all portions to succeed in this course. Here, I describe each portion and detail the activities, readings, and special considerations.

Lecture

- **Prepare:** Read the textbook chapters and watch the lecture videos provided. Slides will be provided at D2L before the lectures. **All cell phones should be turned off before entering the classroom to prevent disturbing the class.** No texting in class once lecture begins.

- Participate: Class attendance is crucial for maximum performance. We will practice the material and work through some of the study guides together. In addition, announcements and questions about the material come up in these sessions, keeping us all on the same page. Importantly, we will have **in-class activities like think-pair-share and checking concepts to help you increase your grades (up to 100 points)**; see grading policies). Therefore, I strongly encourage you to attend and participate actively!
- Study for exams: These tests will allow you to evaluate your comprehension and challenge your abilities. To succeed in these tests, it is not enough to study the night before. Instead, you should be up to date with the material and practice regularly.

Scientific reading:

- Prepare: Read the scientific article assigned. Think critically about the subject, don't stay on the surface. We are interested in your opinion as a professional!
- Participate: This activity can be completed in class or as homework. If the activity is conducted in class, you will work in groups of 2-3 students. You will work individually if the activity is assigned as homework. The answers must be uploaded to D2L, indicating the names of the contributors.

Data analysis:

- Prepare: Read carefully the handout assigned and visualize the connection between the activity and the content covered during the lecture.
- Participate: We will follow a similar approach to that of the scientific reading portion. Therefore, this activity can be completed in class or as homework. If the activity is conducted in class, you will work in groups of 2-3 students. You will work individually if the activity is assigned as homework. The answers must be uploaded to D2L, indicating the names of the contributors.

Group interview:

- Prepare: Participate actively with your group in searching for the interviewee and brainstorming questions for the interview.
- Participate: Take a role in the group project. Introduce yourself during the interview and ask at least one question.

Lab

- Prepare: Attend all sessions of the workshop of R and practice the material because it will be essential to succeed in this portion of the course! Foster fluent communication with your team during the execution of the research project.
- Participate: Don't feel intimidated by the coding part! Everyone can learn how to create scripts and analyze data in R; patience, practice, and enthusiasm are needed! Coordinate with your team during data collection and collectively work on the data analysis and poster preparation.

Grading policies

Final grades will be based on the percentage of points earned out of 880 points. It is important to remember that although I assign the grades, you earn the points. Points will be earned based on the following criteria (Table 1):

Class Portion	Number	Points/Unit	Total
Lecture			
Exams	4	100	400
Percentage and Total		59%	400
Critical Thinking			
Scientific reading	5	10	50
Percentage and Total		7%	50
Class portion	Number	Points/Unit	Total
Quantitative Thinking			
Data analysis	5	10	50
Percentage and Total		7%	50
Class portion	Number	Points/Unit	Total
Teamwork			
Ecologist interview	1	25	25
		4%	25
Class portion	Number	Points/Unit	Total

Class Portion	Number	Points/Unit	Total
Lab			
Attendance R workshop	5	1	5
R workshop activities	5	10	50
Research project	1	100	100
		23%	155
TOTAL			680
Class portion (voluntary)	Number	Points/Unit	Total
Class participation			100
TOTAL WITH BONUS			780

The final grade will be based upon the following system:

A = 90% and above (612 points and above)

B = 80-89% (544-611 points)

C = 70-79% (476-543 points)

D = 60-69% (408-475 points)

F = Below 60% (below 407 points)

I reserve the right to move the curve downward (e.g., such that a 78% could be a B) and to use +/- grades.

Grading the items listed above will be based on the following criteria and policies:

Lecture: You are expected to participate in all activities and in general engage with the subject matter. It is natural that some people will talk more than others, but absolute silence is not an option. Don't be afraid to ask questions or provide input. This is good for you and for the rest of the class.

- Exams: Written exams will be a mix of short answers, fill-in-the-blanks, definitions, multiple-choice questions, essays and problems to be solved. While some questions will be over material explicitly covered in lectures, other questions may ask you to apply what you have learned to a new situation or take it further than we did in class. Reviewing your

notes is only the beginning of your preparation, you must practice the material thoroughly.

- **Make-up exams will only be available if you have a verified medical or similarly valid excuse and must be taken in a timely fashion within one (1) week of the original exam date.** Once an exam has been handed out, students are not allowed to leave the classroom and return. Please make every effort to come to the classroom prepared for the test. **All cell phones must be silenced before the test is handed out. Do NOT pull out your cell phone at any time during the test!** All personal items must be stored under your desk so that the exam proctor may use the aisles during the exam. Attempting to cheat on an exam by looking at someone's test is a serious offense and will result in a grade of zero for that exam.

Critical Thinking: The primary goal of this activity is to guide you through a directed and efficient reading of the scientific literature. You will learn how to extract the essential pieces of information from a manuscript, allowing you to maximize your ability to be updated in the literature of any scientific field. Furthermore, you will use this information to identify actual top-notch works that can influence the progress of the field.

- Scientific Reading: We will have five sessions where you will read influential manuscripts published in top-ranked scientific journals in Ecology. You will work in groups of 2-3 students if the activity is conducted in class and individually if assigned as homework. Address the questions in the handout directly and avoid vague answers. Use a direct and concise style, avoiding slang and plagiarism. **Upload your answers to D2L. If working in a team, choose a group representative who should upload the group answers indicating the name of the contributors.** You can reach up to 10 points for each reading assignment.

Quantitative Thinking: The primary goal of this activity is to stimulate your quantitative reasoning. Rather than being able to solve a mathematical equation, you will understand how quantitative data is gathered, represented, and correctly interpreted using graphs, charts, tables, and diagrams.

- Data analysis: We will have five sessions where you will work on a combination of problems, figures and/or tables. You will work in groups of 2-3 students if the activity is conducted in class and individually if assigned as homework. You can reach up to 10 points with your answers per activity.

Teamwork: The main goal of this portion of the course is to foster teamwork, project management, and communication skills.

- Group Interview: You will identify a professional in the field of Ecology (researcher or professor) and conduct an interview. The interviewee must work in an institution outside of Midwestern State University. Everyone in the group should participate in organizing group tasks, selecting the interviewee, planning and executing the interview, and creating the audiovisual resource. You will work in a team of four students, one being the group leader for communication with the instructor. The questions should focus on their research, undergraduate experience, and pieces of advice for your career development.

You can reach up to 25 points with this group project. **This activity will generate a valuable audiovisual resource for the community of students about ecological research.**

Lab: The concept of labs in Ecology will be very different from the standard approach used in other courses. **The overarching goal of the lab portion is to give you a hands-on experience in the ecological research process.** So, you will experience the whole research process, from the generation of hypotheses to the presentation of your results. In addition, you will collect data from an experiment and analyze your own dataset. To achieve this quantitative training, we will go through an intensive workshop focused on using R, the most popular analytical tool used by researchers and data scientists worldwide. Then, we will design a field experiment on our university's campus, analyze the data generated and present the results in a format similar to that used in scientific meetings.

- R Workshop Attendance: We will have a workshop focused on using R in data science. This workshop is composed of 5 sessions, and you can get up to 5 points just for attendance (1 point per session)
- R workshop Activities: Handouts with the tutorials and exercises will be available in D2L. Please, print the handout before coming to the lab session. These handouts include scripts that you will use to recreate the examples covered in class. Furthermore, you will find exercises that you should reply during the session and others that will require some homework. You must upload your answers and code to D2L. You can get up to 10 points for each activity.
- Research project: You will work in a group of four students. First, we will conduct a seed removal experiment at the campus that will address one different question per group. Then, you will analyze your dataset using the concepts learned in our R Workshop. Finally, you will present your results to your classmates with a poster or oral presentation. This research project is a central activity in the course and is worth 100 points!

Additional considerations

All apparent grading errors, disputes, and so forth must be submitted in a formal email to Dr. Castilla **within one week of the date when the grade is posted**. If you are disputing the scoring of an answer, you must include a written explanation of why you believe your answer is correct.

Late work will only be considered if there is a verified medical or similarly valid excuse and must be taken promptly within one (1) week of the original date.

Topical outline

Topic	Textbook
Introduction	Chapter 1
Climates and Biomes	Chapter 2
Adaptations to Aquatic Environments	Chapter 3
Adaptations to Terrestrial Environments	Chapter 4
EXAM 1	
Life histories	Chapter 7
Reproductive strategies	Chapter 8
Population Distribution	Chapter 10
Population Dynamics	Chapter 11
EXAM 2	
Predation and Herbivory	Chapter 13
Competition	Chapter 15
Mutualism	Chapter 16
Community Structure	Chapter 17
Community Succession	Chapter 18
EXAM 3	
Movement of Energy in Ecosystems	Chapters 19 and 20
Landscape Ecology and Global Diversity	Chapter 21
Conservation of Global Biodiversity	Chapter 22
EXAM 4	

Flexibility Clause

Circumstances during the semester may prevent the professor from fulfilling parts of **this syllabus**; therefore, it **should be viewed as a guide and subject to change**. Students will be notified of any changes.

Communication

- We will communicate with you about the course through the main email address as listed by MSU Texas. Ensure that you receive these emails in a timely fashion, either by checking your account regularly, or by forwarding your messages to an account that you check regularly. To ensure timely response, add BIOL 1214 to the subject line. Make sure to write emails in an organized, clear way. Use full sentences and avoid slang. Begin with a formal greeting and finish with your complete name.
- We will be using D2L regularly in this course. It is important that you check the website often during the week. I will post announcements, readings, assignments, and other materials there. Although the class schedule may change, these changes will always be updated in D2L. You should be able to log into D2L. If you have trouble, please contact the Distance Education Department at Midwestern State University: [Distance Education](#)

Inclusivity Statement

I encourage every student in this class to speak freely and participate. Each of us must show respect for each other because our class represents a diversity of beliefs, backgrounds, and experiences. I believe that this is what will enrich all our experiences together. I recognize that our individual differences can deepen our understanding of one another and the world around us, rather than divide us. In this class, people of all ethnicities, genders and gender identities, religions, ages, sexual orientations, disabilities, socioeconomic backgrounds, regions, and nationalities are strongly encouraged to share their rich array of perspectives and experiences. If you feel your differences may in some way isolate you from our classroom community or if you have a specific need, please talk with me so that we can work together to help you become an active and engaged member of our class and community (adapted from CSU Chico and Winona State University).

University Policies

MSU Texas policies, procedures and resources: [Security Policy and Procedures](#)

Academic Honor Policy: You are responsible for knowing the policy regarding academic honesty. Students are expected to maintain high standards of academic integrity at all times. No forms of academic dishonesty (cheating, plagiarism, etc.) will be tolerated. I will take any

violation of the University's Academic Honesty Policy very seriously. I trust you to be honest. Do not violate that trust. For further information: [Student Conduct](#)

Students with disabilities: If you need accommodations, please contact the disability support services as soon as possible. Some accommodations may take some time to arrange. Feel free to contact me if I can be of any help.

Debra Higginbotham

Clark Student Center, 168

disabilityservices@msutexas.edu

(940) 397-4140

(940) 397-4180

Add/Drop policy: March 27th, 2023, is this semester's deadline to Add or Drop classes without serious and compelling reasons. It is your responsibility for following up on these procedures. For more information: [Add/Drop Policy](#)

Emergency and crises: In case of emergencies and crises, I will work with you to make arrangements and accommodations. Excusable absences under this category include illness, death in the family, dependent children serious illness, and other documented crises, call to active military duty or jury duty, religious holydays, and official University activities. Absences for religious holidays require you to notify me at least 14 days in advance. Please don't agonize about your class if you are in a crisis, just let me know. Note that documentation will be necessary in all instances. This allows us to make arrangements associated with evaluation and grading. For more information: [Crisis Counseling](#)

Tutoring at MSU Texas: Midwestern State University provides Tutoring and Academic Support Programs. For more information: [MSU Tutoring](#)

Emergency procedures: Review the evacuation plan and emergency procedures for our classrooms. During an emergency, follow instructions and information provided at [Emergency Procedures](#)

Campus carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit [Campus Carry](#).

Active Shooter: The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit [Safety / Emergency Procedures](#). Students are encouraged to watch the video entitled "Run. Hide. Fight." which may be electronically accessed via the University police department's webpage: "Run. Hide. Fight."