The Indiana Academy for Science, Mathematics, and Humanities
SCI04309.1 Principles of Ecology Fall 2025

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Office hours: Monday 9-10 AM, 1-3 PM
Wednesday 9-10 AM, 1-3 PM
Thursday 1-3 PM (generally by Zoom)
Friday 11 AM – noon, 1-2 PM
These office hours are suggestions for when you might find me in my office. However, you are welcome to check to see if I am available at other times. Also, I may not always be in my office during the stated office hours, so it is best to make an appointment if you want to be sure to catch me.

Class meetings: In Burris 211. MWF 11-11:50 AM, Lab on Thursdays 4-5:45 PM
Some "laboratory" activities will be field excursions; i.e., we will conduct them outside. Also, our schedule will be somewhat flexible as students will be working on independent research projects.

Description:

Corequisite: Principles of Ecology Laboratory (SCI4309L)
Credit: 1.5 credits
Offered: Spring

This course explores the ways in which organisms interact with their environment. Topics include physiological ecology, population ecology, life history, social ecology, population genetics and natural selection, species interactions, community structure and diversity, broad-scale ecology, ecosystem ecology, biogeography, and global ecology. Hands-on laboratory and field activities reinforce fundamental concepts.

Student learning outcomes:

Upon completing this course, students will be able to describe the ways in which organisms interact with their environment at the levels of physiology, population, species interactions, ecological communities, ecosystems, biomes, and the biosphere. Students completing this course will be able to apply the concepts of life history, social ecology, population dynamics, population genetics, natural selection, community structure and diversity, nutrient cycling, energy flow, and biogeography to discuss ecological processes. Students who complete this course will be able to use laboratory and field techniques to investigate ecological phenomena. Students who complete this course will also be able to design and conduct independent research projects in ecology.

Course materials:

Textbook: Ecology: The Economy of Nature, 10th ed., Rick Relyea, Macmillan Publishing, ISBN:9781319524883 (E-book)

We will use various information sources throughout the semester. You should have a lab and field notebook (separate from your lecture notes) for recording data for lab exercises and your independent research project.

Please note that some aspects of this course may need to be changed during the semester, so this syllabus is subject to revision. If the syllabus is revised during the semester, the updated syllabus will be posted on Canvas. Please refer to Canvas for updated information.
I welcome input from students on how to develop this course.

Assignments:

Assignment	Points	Number	Total
Quizzes	5-15	4	30
Homework	5	4	20
Lab/field project reports	10	9	90
Midterm exam	50	1	50
Comprehensive final exam	60	1	60
Problems	5	5	25
Discussions	50	4	200
Independent research project proposal	20	1	20
Independent research project progress checks	5-10	3	25
Independent research project report	100	1	100
Independent research project presentation	50	1	50
Mini-lecture presentations	25	4	100
Lab/field notebook	100	1	100
Total		60	870

Quizzes—We will have quizzes in class or on Canvas. Quiz questions will be multiple choice, short answer, or matching. I will assess answers based on correctness, completeness, and clarity.

Homework—Students will complete homework assignments throughout the semester. I will assess answers to homework questions and problems based on correctness and completeness.

Lab/field investigations—We will complete lab- and/or field-based investigations weekly during the early part of the semester, leaving time later in the semester for students to work on independent projects. Most studies we will design ourselves. For most investigations, each student will be expected to submit an original report that describes the background, methods, results, and findings. I will assess reports based on completeness, organization, correctness of analysis, and justification of conclusions.

Examinations—Exam questions will include multiple choice and free response questions. The final exam will be comprehensive. I will grade answers based on correctness, completeness, and clarity.

Problems—Students will complete problems inside or outside of class. These are like homework

assignments but tend to be quantitative or analytic. I will grade answers based on correctness, completeness, and clarity.

Discussions—We will have several discussions over articles from peer-reviewed ecological journals. Each student will choose an article to read and facilitate a discussion over that article. I will assess participation in discussions based on degree of preparation, willingness to engage with the material, and quality of contributions.

Independent project—Each student will design and conduct an independent research project on an ecological question of interest to that student. Early in the semester each student should submit a proposal detailing plans for the project, so that I can evaluate the feasibility, provide suggestions, order equipment, plan field excursions, etc. This project will involve laboratory and/or field work. The report should cite peer-reviewed references and present the student's observations and data, hopefully answering the question addressed. I will assess the report based on accuracy, organization, clarity, originality, and reasoning. Students will also present their projects in class.

Mini-lecture presentations—Each student will choose lecture topics to cover during the semester. The student will present the topic to the class. Presentations will be assessed based on preparation, accuracy, and articulation.

Lab notebook—Each student will maintain a lab notebook with observations, drawings, and data from lab and field exercises. This notebook will be submitted at the end of the semester. You can bring it to the final exam, and I will look through it while you take the exam. I will assess the notebook for neatness, completeness, and attention to detail.

Attendance

Please arrive on time to class. The instructor is required to take attendance so that all students are accounted for. If you arrive late to class, someone might start checking to see where you may be. If you are late, you may need to remind the instructor to change the absence to tardy. This will disrupt our workflow and possibly the workflow of others, so please try to avoid being late.

If you miss class for any reason, you are responsible for obtaining any notes, announcements, reading materials, or assignments from the instructor or a classmate. If an unavoidable conflict, emergency, or illness prevents you from attending class or completing an assignment on time, please inform the instructor as soon as possible (preferably beforehand). The Academy and not the instructor determines whether an absence is excused or unexcused. No direct grade penalty is assessed for an absence. However, you will have a much greater chance of success if you are present as much as possible.

Indiana Academy Absence Policy

Attendance is mandatory. Students may receive excused absences at the professional discretion of the school nurse, the associate director of mental health services, the associate director of college counseling and student engagement, the director of academic affairs, and the executive director of the Indiana Academy. Unexcused absences occur when students miss class without prior approval from the aforementioned designated school officials. Continued absences (both excused and unexcused) from Academy classes increase the likelihood of unsuccessful completion.
Alongside steady attendance, students are expected to maintain consistent healthy habits of decorum, respect, and kindness towards their classmates, instructors, and teaching assistants. When students fail to meet these classroom behavioral standards and academic habits, it is the expectation faculty engage appropriately to bring quick and immediate resolution. When students consistently fail to meet these behavioral standards and academic habits in the classroom, an administrative consequence ladder will be adopted, and recorded, in attempt to administratively address, engage, and rectify ongoing challenges.

Academic conduct

It is important to prepare for each class meeting by completing the reading and any assignments that are due. Assignments should be submitted on Canvas or in class, depending on the assignment. Although some activities such as labs may be completed together as a class, each student is individually responsible for submitting assignments with original writing (not copied from your lab mate). You are encouraged to discuss answers to lab activities with other class members, but the wording should not be the same. Do not share word processing files with each other, but make sure each student has access to the raw data for analysis.

You are expected to conduct yourself according to the Indiana Academy Student Handbook (https://academy.bsu.edu/handbook/), especially the Code of Conduct and the section on Academic Integrity. On writing assignments, please be sure to use your own wording and cite all sources of information, whether from the Internet or otherwise. If you are not sure how to cite something, ask the instructor. Note that language copied verbatim from a book, website, another student's paper, or any other source is considered plagiarism unless it is in quotation marks and cited. Plagiarism is a form of academic dishonesty. Please do not plagiarize or cheat in any other way. An infraction may result in a 0 for the assignment. Also, the instructor is required to report any ethics violations to the Academic Integrity Board.

Artificial intelligence (AI) technology

Technologies referred to as “artificial intelligence” (AI) are becoming increasingly salient in our lives, sometimes with more emphasis on artificial than on intelligence. The original Turing test (Turing, 1950) for artificial intelligence is to engage in dialogue with what we would now call a “chatbot”. If the discourse is indistinguishable from that of a human, then it is considered artificial intelligence. Modern large language models such as ChatGPT (OpenAI, 2022) exemplify this approach by stringing together words from human writing to sound intelligent (without always being intelligent).Community ecology homework

These tools can be very useful, from simple spellchecks to generating computer code. As we adopt these technologies, however, it is important to verify that information obtained is correct and to avoid presenting as our own work that was produced by software or anyone else. We can avoid these pitfalls if we use the auto-generated content as a starting point but not as a finished product. Find the original sources of information and cite those. ChatGPT has a reputation for making up references that don’t exist, so don’t rely on it.

References and resources on AI:

OpenAI. 2022. ChatGPT, Version 3.5. OpenAI, accessed 12 May 2024 at https://chatgpt.com/.

Turing, Alan M. 1950. Computing machinery and intelligence. *Mind* LIX(236):433-460, https://doi.org/10.1093/mind/LIX.236.433, accessed 12 May 2024 at https://academic.oup.com/mind/article/LIX/236/433/986238?login=false.

Classroom conduct

Please be considerate of other classmates. Keep any devices not used for classroom activities silenced or off. Use of electronic devices during class can be distracting to yourself and others and interfere with the learning process. Your phone should be put away if it’s not being used for class. A new Indiana state law prohibits the use of phones in class by high school students except during an emergency or when being used for class activities with the instructor’s permission. Laptops can be used in class for class activities, but repeated use for non-class activities may result in a loss of that privilege. A calculator (but not a phone) may be used for exams.

IA Wireless Device Policy:

Pursuant to Indiana Code 20-26-5-40.7, The Indiana Academy for Science, Mathematics and Humanities prohibits student use of wireless communication devices for non-instructional purposes in the classroom. As such, any and all portable wireless devices, that have the capability to provide voice, messaging, or other data communication between two or more parties, must only be used for academic purposes directly tied to the classroom activity or related educational task. Exceptions to this wireless device policy are eligible through academic accommodations, individualized education programs, or with instructor approval permitting the use of a wireless device for justification related to health, safety, and/or well-being. The improper use of a wireless device in an active classroom setting is subject to disciplinary action including but not limited to; a verbal warning, temporary seizure of said device by a school official, an unexcused absence for the class in question, written communication to parent/guardian, among other elevated consequences for repeated improper use.

Please treat each other with respect and refrain from annoying behavior. Do not interrupt another student or the instructor. If you are having difficulty getting a word in, you can raise your hand.

Examples of improper conduct include having extended conversations, working on assignments for other courses, sleeping, etc. Serious and/or chronic problems may be cause for dismissal from the course.

Late work

If you are late submitting an assignment because you missed class, see the section above on attendance. If an absence is excused by the Academy, the instructor will make every reasonable effort to ensure you have the opportunity to make up any assignments associated with the absence. If you are late submitting an assignment associated with an unexcused absence or for a reason unrelated to missing class, the instructor may grade the assignment as time allows.

If an exam is missed because of an excused absence, the instructor will make every reasonable effort to ensure you have the opportunity to make it up. If the absence is unexcused, a make-up exam may be allowed at the instructor's discretion. If a lab is missed, it may be difficult to arrange for a student to make it up due to supplies and logistical constraints. If the absence was excused, the instructor may need to substitute an alternate activity.

Library research

Through your association with Ball State University, you have access to an academic research library with many useful materials. This includes online access to many peer-reviewed scientific journals through bibliographic databases to which Ball State subscribes. To access these databases, go to https://www.bsu.edu/library, and scroll down to "Databases". The databases are listed in alphabetical order by the first letter. Two good ones to try are Academic Search Complete under "A" and JSTOR under "J". When you click on one of these databases, you will be prompted to log into your Ball State account. You can search for articles on particular topics and then access the full text of many articles from the journal publishers' websites. Also, if you are logged into https://myballstate.bsu.edu, try searching on Google Scholar at https://scholar.google.com. You should see "Find it at Ball State" for references available through university subscriptions.

Student accommodations and special circumstances
If you have an IEP or a 504 that provides accommodations, have emergency medical information to share, or need special arrangements in case the building needs to be evacuated, please make an appointment to speak with me as soon as possible.

If you are struggling with study habits, stress, and/or personal issues, I encourage you to discuss the situation with your SLC and/or contact the Guidance Office for help in addressing these issues so that you can thrive at the Academy. Many resources are available for students, and important contact information is listed below:

For guidance: Meg Wright (mewright@bsu.edu), phone:765-285-7407; office: WA182.
To find a tutor: Meg Wright (mewright@bsu.edu), phone:765-285-7407; office: WA182.
For mental health: Dr. Mindy Wallpe (mcwallpe@bsu.edu), phone: 765-285-5483; office: WA 160B.

INDIANA ACADEMY BENIFICENCE STATEMENT:

Ball State University aspires to be a university that attracts and retains outstanding faculty, staff, and students. Ball State is committed to ensuring that all members of the campus community are welcome through our practice of valuing the varied experiences and worldviews of the people whom we serve. We promote a culture of respect and civil discourse as evident in our Beneficence Pledge. As a reflection of Ball State's commitment to respect, civil discourse, and the Beneficence Pledge, inclusiveness at the Indiana Academy emerges as one of the priorities of our living and learning community. We strive to exist together respectfully and compassionately, creating an environment where every member can thrive.

Schedule (subject to revision as needed)

11 August	Introduction to course, the scientific method	Syllabus
12 August	Lab safety, walk on campus	Lab safety worksheet
13 August	Introduction to ecology, physiological ecology, population ecology	
15 August	Community ecology, ecosystem ecology, conservation biology	
18 August	Climates and biomes, physiological ecology	Physiology homework
19 August	Bird nests, Adaptations to terrestrial environments	Bat hibernation
20 August	Adaptations to aquatic environments	Energy budget problems
22 August	Planning squirrel time budget investigation	
25 August	Organisms, adaptations to variable environments	Physiological ecology quiz
26 August	Discussion on squirrel journal articles	Squirrels module on Canvas
27 August	Evolution and adaptation, life histories, reproductive strategies	
29 August	Student presentations on social behaviors	
3 September	Student presentations on life history	
5 September	Population ecology, measuring abundance, spatial distribution (dispersion), pop growth	
8 September	Population distributions: age distributions, frequency distributions, statistics	
9 September	Squirrel social behavior investigation	
10 September	Population growth, population regulation	Life history/social behavior quiz
12 September	Hardy-Weinberg problems	Proposal for independent project due
15 September	Population genetics problems, natural selection problems	
16 September	Hardy-Weinberg lab	AP Biology Investigation 2
17 September	Population dynamics over space and time, species interactions	
19 September	Population/habitat/species interactions quiz	Population dynamics problem
22 September	Review for exam 1	Population dynamics problem due
23 September	Cardinal population investigation, birdwatching field trip, reproduction homework due	
24 September	Exam 1	
26 September	Competition, predation, parasitism	
29 September	Journal article discussion	
30 September	Effect of tree distribution on squirrel abundance, species diversity investigation	
1 October	Herbivory, mutualism	
3 October	Parent/Teacher Conferences	
8 October	Lotka-Volterra competition problem	
9 October	Tuesday classes on Thursdays, fall squirrel time budget investigation	
10 October	Lotka-Volterra predation models, species diversity	
13 October	Irish potato famine, infectious diseases	Species interactions quiz
14 October	Plan tree survey	
15 October	Ecological succession	

17 October	Community ecology journal article discussion	
20 October	Equilibrium vs. nonequilibrium models, resilience	Students present on readings
21 October	Respiration lab with germinating peas	AP Biology Investigation 6
22 October	Community structure and diversity	
24 October	Plan independent projects	
27 October	Ecosystem ecology, nutrient cycles, energy flow	Plan student lecture presentations
28 October	Tree survey	
29 October	Work on independent projects, tree distribution lab	Nearest neighbor homework
31 October	Youth Environmental Leadership Summit at Indiana University Bloomington	
3 November	Animal awareness, parasites, species diversity problems	Journal article discussion
4 November	AP Biology Lab 11 on transpiration	
5 November	Student presentations on biogeochemical cycles	
7 November	Broad-scale ecology: landscape ecology, biomes, biogeography	
10 November	Biodiversity conservation, global biodiversity	Independent project progress check
11 November	Work on independent projects	
12 November	Student presentations on the biosphere and global ecology	
14 November	Course planning, discuss independent projects, independent project progress check	
17 November	Plan for Envirothon season in spring	https://indianaenvirothon.org/
18 November	Work on independent projects, biome homework	Independent project progress check
19 November	Student presentations on lecture topics	
21 November	Student presentations on lecture topics	Nutrient-cycling homework
1 December	Biodiversity problems	
2 December	Work on independent projects	
3 December	Biosphere homework	
5 December	Broad-scale ecology quiz	
8 December	Conservation homework	
9 December	Independent project reports due	
10 December	Students present on independent projects	
12 December	Review for final exam	
15-18 December	Final Exam Week	