



Syllabus – *Principles of Ecology*

University of Maryland - College Park

BSCI 361
Spring 2023

Course Overview and Organization

Principles of Ecology is a one-semester, 4-credit, overview of the study of the distribution and abundance of life on Earth, with the use of core principles to predict consequences and uncertainties associated with human-caused changes in the biotic (living) and abiotic (non-living) elements of the environment. Topics span levels of biological organization from individuals, to populations, communities, ecosystems, and global ecology.

The course is structured with 75-minute, twice weekly 'lecture' sessions and a 50-minute, once weekly 'discussion' section. Lecture sessions will be a mix of actual lectures led by Dr. Gruner along with 'clicker' questions, active individual work, and group discussions or problems. The discussion section led by Ms. Sáenz, designed to complement the text and lecture, will primarily involve critical review and evaluation of primary literature and the preparation of a review paper. With this term paper assignment, students will choose an ecological topic, research the topic in depth, assemble bibliographic references, and write an evidence-based critical literature review.

This course will have a synchronous structure on Canvas (ELMS), and we expect to meet in person. We will reserve the flexibility to use Zoom if circumstances require changes in campus policies. A laptop or functional tablet is recommended, as is a mobile device for live 'clicker' polling. Whether IRL or fully online, we will push you to take an active role in the learning process. You will do this by engaging and collaborating with other students and the instructor on a regular basis, whether in live sessions, through group work and activities, or through individual ecological inquiry assignments.

Learning Outcomes

After completing this course, students should be able to:

1. Develop an understanding of ecological interactions among individuals, populations, communities, and ecosystems within a broad physical, geographical, and evolutionary context.
2. Demonstrate an understanding of scientific inference and the diverse ecological research methods to evaluate alternative hypotheses with evidence.
3. Evaluate mathematical equations, analyze graphical data, and apply calculations to solve ecological problems.
4. Discover, evaluate, and synthesize ecological evidence from the primary literature and communicate findings in written form.

Dr. Daniel Gruner (he/him)
Plant Sciences 4142
dsgruner@umd.edu

Ms. Ángela Sáenz (she/her)
Plant Sciences 4148
ansaenz@umd.edu

'Lecture'

Tuesday & Thursday
9:30 a.m. – 10:45 a.m.
PLS 1130 (Zoom if needed)

'Discussion' Sections

Wednesday
001: 1-1:50; 002: 2-2:50
PLS 1115 (Zoom if needed)

Website

<https://elms.umd.edu/>

Office Hours

Gruner: M 11-12, Th 2-3
Sáenz: W 3-4, F 2-3
Or by appointment/Zoom

Required Text

Ecology, 5th Ed. (2021)
Bowman & Hacker
eISBN: 9781605359236
[\(\\$65/180 days rental\)](#)

Prerequisites

- BSCI 160/161 (or BSCI 106)
- MATH 130 (or MATH 140)

Communication

- ELMS announcements & email system
- Office hours/appointment

Resources and Tech

Course materials, Zoom links, access to media, quizzes, and discussions will be provided on ELMS, accessible via elms.umd.edu (direct: <https://umd.instructure.com/courses/1338626>).

Text: This course requires access to the textbook: **Bowman and Hacker - Ecology** (5th ed., Oxford University Press, ISBN 9781605359236/ 9781605359311) available as an ebook on **RedShelf** or as a paperback or loose-leaf rental or purchase (used or new) through the bookstore or online retailers. Use the earlier editions at your own risk. The publisher provides **supplemental web resources** through a license code that you will need for the course.

Point Solutions ('clickers'): We will use audience response software to engage with live polling, whether in person or remotely (see more under 'Lectures' below). To get credit for your participation, you will need to register using your UMD email address. Registration is free of charge. In class each day, you can participate either through an app (apple or android) on a phone or tablet, or access via the web: ttpoll.com. Join the following session ID to join each day: **'bsci361'**

Panopto: Lectures with powerpoint presentations with audio will be captured via Panopto, which you can find Panopto Recordings on the ELMS site. We will provide outlines and supplemental materials in advance of each lecture, which you are encouraged to use for note-taking, however we will not provide the full powerpoint files. We encourage you to actively take notes in your own words on the main ideas we cover in class; you can review, rewrite or add to your notes by reviewing Panopto sessions later. We are unable to record in-class discussions, group work, or Zoom sessions and breakout rooms, if applicable.

Zoom: If forced by circumstances – pandemic, inclement weather, etc. - we will use Zoom to connect for synchronous meetings (lectures and discussion sections). Prior to class, you need to authenticate by logging into <https://umd.zoom.us/> or by clicking on the Zoom session through the course ELMS page. By authenticating you can join the session without the need for us to admit you manually. Additional tips and guidelines will be provided, if necessary. Meetings with your instructors can be scheduled in this mode.

Course Components

I. Lecture Participation (10%), Quizzes (10%), Exams (35%)

Lecture content will draw in part from the BH textbook and from external sources such as the primary scientific literature, the blogosphere, and popular media. A variable amount of lecture time will be devoted to discussions, independent problem-solving, or group work. Diverse ecological examples will be introduced to inspire you with the diversity and complexity of ecology, and the case studies should help you contextualize ecology's fundamental, core principles. You do not need to memorize the specific organisms, study systems, or scientists' names, but examples in context can help you retain and connect the key concepts.

We cannot hope to cover all important ecological content in lectures, nor should we try. In class, we will focus on depth, building upon the assigned readings from your text and other sources, which will serve as the foundational basis for each lecture topic. We will assume you have read this material in advance of class, and that we do not need repeat tedious facts from your text in class (although please bring to class your questions from your readings). You are expected to read the assignments and watch any assigned videos before lecture each day. **Quizzes** in ELMS based on your reading will be due before each lecture, summing to a total of 10% of your final grade. These quizzes will open 5-7 days before a given class session and you will have two attempts for each, but quizzes will close by 9 AM before class. Thus, it will be essential to keep up with reading assignments. The scores for each quiz will be weighted equally, with the two lowest scores dropped. Each individual quiz is low stakes (<0.5% of your grade) but they add up! You may use your book and notes.

Participation in lecture is essential! We expect you to be actively present, and your engagement and learning will be assessed through the audience response system (**Point Solutions polling 'clickers'**). However, 5% of your total grade will come from clicker questions given throughout the lecture sessions. Participation

throughout each class - not the accuracy of responses - is the sole criterion for earning these points. Each lecture session will be weighted equally, and the two lowest scores will be dropped, to account for technical problems, brief illness, etc. Therefore, should any of these problems arise, please do not ask for an exemption. If you expect an *extended absence*, please follow **university guidance** and inform us as soon as possible.

Structured outlines for lectures will be provided, along with any other supporting documents or links for each topic, and will be posted on ELMS the day prior to class (or sooner). Corrections or updates may be posted following class. Outlines provide an overview of content to be covered in class, key terms, and study questions, all designed to facilitate your organization of topics and structured note-taking. Short recorded videos also will be provided on ELMS to detail some topics and save more time in class for questions and discussion. Classroom audiovisuals will be captured on Panopto and posted on ELMS for your later review; powerpoint files will *not* be posted.

There will be three (3) **midterm exams** to cover the lectures noted in the schedule, and one final exam. The three midterms will not be cumulative, but will cover the specified content areas on the schedule. Your top two will each count for 10% of your final grade, and your lowest score will be down-weighted for 5% (10% + 10% + 5% = 25%). The **final exam** will cover the last portion of lecture & reading content, but will also cover integrative, cumulative topics from the whole semester – it is worth 15% of your final grade. Unless specifically exempted, *all content from the relevant lectures, assigned readings, assigned video topics, and group work on problems is fair game for the exams*. Exams will focus on evaluation and synthesis of important concepts, methods, and case studies from lectures and your readings, but will not require recall of specific names or organisms. You will have access to your notes, calculators, etc.; however, there will be limited time to look up things you have not already learned, and the focus on integration and synthesis will mean that acceptable answers will not be available in your text or in web searches. Most likely, exams will be administered through ELMS, and therefore can be in person or remote. Sections will be time-blocked and shuffled, and any form of academic dishonesty will not be tolerated.

II. Discussion Assignments (15%)

Beginning with the first meeting on February 1, discussion sections meet on Wednesdays (1pm or 2pm) – check your section & the schedule. Discussion will meet 14 times with 12 total assignments. These assignments collectively will make up 15% of your final grade, with your lowest score will be dropped. The majority of discussion assignments will involve readings from the primary literature and both generating and answering questions about the literature. Several will involve data collection guidance and preparation for term paper assignments. Active participation is essential for discussion and late arrival will count against your participation scores. Late assignments will not be accepted but the lowest two will be dropped. See the **Discussion Guidelines** document for more details on expectations for discussion participation and assignments.

III. Term Paper (20%)

A 4-6 page paper (*about* 3000 words, single-spaced, 12 pt. font) will be due electronically on Friday, April 21 – discussion sections will NOT meet that day. Earlier assignments to select your topic (March 15) and create an annotated bibliography (April 5) will help to keep you on track. Collectively, all aspects of the term paper will sum to 20% of your final grade. Your paper can focus on any of the topics in ecology covered during the course, however the TA must approve the ecological content of your topic. Possible topics are infinite, but they must be concept-focused, not organism- or ecosystem-focused, and should be specific enough to get adequate review in a short paper. See the **Term Paper Assignment Guidelines** document for more detailed information, the breakdown of points for each component, and rubrics for assessment. Written academic assignments should always be in your own words. Use appropriate citations and do not plagiarize the authors of the articles in your paper.

IV. Independent Inquiry (10%)

The final graded component of this course (10% of your final grade) will be focused on active, independent learning outside of class. You will be expected to use your initiative and creativity to complete two (2) of the four (4) assignments. The analysis (#1) and video (#3) assignment may be completed in groups of 2-3, although the participation and roles of all members must be clearly evident. All are due a week before the final day of class (May 4), although it would be wise to submit these earlier! In all assignments, we expect you to leverage the concepts covered in this course. More detailed guidance will be forthcoming on the following four themes:

1. Pursue a data-driven **ecological analysis** on freely available datasets from the National Ecological Observatory Network (NEON) using open access R/RStudio software.
2. Complete a **photographic scavenger hunt**: working from a list of ecological concepts and phenomena, you would take clear and identifiable photographs demonstrating examples, such as species interactions (competition, predation, mutualism, etc.), behaviors, life history strategies, ecosystem fluxes, etc. You will create and upload an annotated album with your photos and captions.
3. Produce an original 5-10 minute **video documentary**: a live action or creative video that illustrates or analyzes an ecological concept to upload on youtube, vimeo, or another outlet.
4. Contribute to **ecology online**: contribute to Wikipedia, review an ecology article reviewed in the popular press, and upload iNaturalist contributions.

Grades and Grading

Percentile breakdowns for your final grades are described below:

I. Pre-class quizzes	10%
I. Lecture participation ('clickers')	5%
I. Midterm Exams (n=3, lowest score ½ weight)	25%
I. Final Exam	15%
II. Discussion assignments	15%
III. Term paper total	20%
IV. Independent inquiry	10%
	100%

We will use the following grading percentile scale:

A+	100-98%	B+	89-87%	C+	79-77%	D+	69-67%		
A	97-93%	B	86-83%	C	76-73%	D	66-63%	F	<60%
A-	92-90%	B-	82-80%	C-	72-70%	D-	62-60%		

We are committed to academic integrity and a transparent, fair, and inclusive semester. First, there will be no curve on final grades; it is therefore possible that all students could earn an "A" or "B." For numerically borderline cases (<0.5%), final grades will automatically round up to the nearest whole number if a student would qualify for the next higher grade. However, individual exceptions cannot be negotiated – you either have the scores or you do not. Grades are applied consistently and without favoritism, and you must take responsibility for your progress and performance. Any appeals to exam scores – on the basis of clear errors – must come in writing within 7 days of posting. Second, with one exception to follow, extra credit is not offered, because (1) the ability to drop poor scores or to choose assignments provides a flexible buffer for your complex lives, and (2) the opportunity for extra credit is not equitable, as some are less able (parents, students working full- or part-time) to have the time to invest than others. This semester, in order to participate with a BSCI initiative to elevate teaching and learning on the topic of climate change, we will offer extra credit for your participation in two short surveys administered at the start and again at the conclusion of this course.

Course Schedule (See ELMS for assignment details)

#	Date	Topic	BH 5e
1	26-Jan	Introduction: What is Ecology?	1
2	31-Jan	Climate & the Physical Environment	2
	1-Feb	<i>Discussion 1</i>	
3	2-Feb	Linking the Physical Environment to Large-Scale Biological Patter	3, 20
4	7-Feb	Autotroph Energy Gain & Physiological Ecology	4, 5
	8-Feb	<i>Discussion 2</i>	
5	9-Feb	Heterotroph Energy Gain & Physiological Ecology, Part 1	5, 8
6	14-Feb	Heterotroph Energy Gain & Physiological Ecology, Part 2	4
	15-Feb	<i>Discussion 3</i>	
	16-Feb	EXAM 1 (lectures 1-6)	
7	21-Feb	Adaptation	6
	22-Feb	<i>Discussion 4</i>	
8	23-Feb	Reproduction & Life Histories	7, 8
9	28-Feb	Population Distributions	9
	1-Mar	<i>Discussion 5</i>	
10	2-Mar	Population Growth	10, 11
11	7-Mar	Demography, Part 1	10, 11
	8-Mar	<i>Discussion 6</i>	
12	9-Mar	Demography, Part 2	10, 11
13	14-Mar	Metapopulations & Conservation	9, 10, 24
	15-Mar	<i>Discussion 7</i>	
	15-Mar	Term Paper Topic Due	
	16-Mar	EXAM 2 (lectures 7-13)	
Spring Break Holiday, March 18-26			
14	28-Mar	Competition	14
	29-Mar	<i>Discussion 8</i>	
15	30-Mar	Predation	12
16	4-Apr	Herbivory	12
	5-Apr	<i>Discussion 9</i>	
	5-Apr	Term Paper Annotated Bibliography Due	
17	6-Apr	Parasitism & Disease	13
18	11-Apr	Mutualism & Facilitation	15
	12-Apr	<i>Discussion 10</i>	
19	13-Apr	Community Assembly & Coexistence	16, 19
	18-Apr	EXAM 3 (lectures 14-19)	
	19-Apr	<i>Discussion 11 optional - work on papers</i>	
20	20-Apr	Food Webs & Systems Ecology	16, 21
	21-Apr	Term Paper Due	
21	25-Apr	Ecosystems Ecology, Part 1	22
	26-Apr	<i>Discussion 12</i>	
22	27-Apr	Ecosystems Ecology, Part 2	22
23	2-May	Landscape Processes	17
	3-May	<i>Discussion 13</i>	
24	4-May	Diversity & Scale	18, 24
	4-May	Independent Inquiry Assignments Due	
25	9-May	Biogeography & Macroecology	6, 18
	10-May	<i>Discussion 14</i>	
26	11-May	Global Ecology	25
		Final Exam (Date, Time TBA) (cumulative + lectures 20-26)	

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include the following topics:

- Academic integrity
- Attendance and excused absences
- Accessibility and accommodations
- Grades and appeals
- Student and instructor conduct
- Copyright and intellectual property

Visit the [Office of Undergraduate Studies' full list of campus-wide policies](#) and follow up with questions.

Course-Specific Policies

Academic Integrity

At all times, students must adhere to the [UMD Code of Academic Integrity](#) and the student-generated [Honor Pledge](#). We follow University policy regarding academic dishonesty, which includes plagiarism, cheating, fabrication, and facilitating academic dishonesty. The use of generative AI, such as GPT-3 or other similar tools, is strictly prohibited in this course. All work submitted must be the original work of the student, and the use of such tools undermines the integrity of the assignment and the educational process. A significant percentage of plagiarism cases are unintentional, therefore it is the responsibility of students to understand plagiarism and take steps to avoid it. Violations of the academic integrity policy can result in a failing grade for the class with an indication of academic dishonesty noted on the transcript. **Academic dishonesty will not be tolerated.**

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. We invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.) in your ELMS profile and/or your Zoom profile. Please respect that the pronouns someone chooses are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more. Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. We will do our best to address and refer to all students accordingly, and we ask you to do the same for all your fellow Terps.

Communication with Instructors

If you need to reach out to the instructor or TA, please email using the ELMS inbox (preferred) or by standard email, while identifying yourself and the course in which you are enrolled. Please do not email us with questions that are easily found in the syllabus or on ELMS (i.e. When is this assignment due? How much is it worth? etc.) but please DO reach out about personal, academic, and intellectual concerns/questions. We will do our best to respond to emails within 24 hours during the week (Monday-Friday). We will send important announcements via ELMS messaging. Please enable your email & announcement notifications (including changes in assignments and/or due dates) in ELMS so you do not miss any messages. You are responsible for checking your email and ELMS inbox with regular frequency.

Communication with Peers

With a diversity of perspectives and experience, we may disagree with one another. As such, it is important that we conduct ourselves in a professional manner and that we work together to foster and preserve a classroom environment in which we can respectfully discuss controversial questions. We encourage you to confidently

exercise your right to free speech—bearing in mind, of course, that this course is NOT the space for hate speech, harassment, and derogatory language. We will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued. Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please alert us immediately at any point during our semester if your engagement has been in some way hindered in the learning environment, or consult [resources from the Office of Diversity & Inclusion](#).

Resources & Accommodations

COVID-19

We will adhere to campus policies for COVID-19 at all times. General information can be found at the [4Maryland](#) page. We encourage mask use to prevent transmission. If you test positive or have close contact(s) or potential exposure, please consult the [HEAL Line](#) for isolation and quarantine information and advice. Notify your instructors as soon as possible if you must be absent from class or discussion.

Accessibility and Disability Services

The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The [Accessibility & Disability Service \(ADS\)](#) provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact Dr. Gruner as soon as possible to make timely arrangements. For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at adsfrontdesk@umd.edu. Information about sharing your accommodations with instructors, note taking assistance, and more is available from the ADS site.

Student Resources and Services

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit [UMD's Student Academic Support Services website](#) to learn more about the wide range of campus resources available to you. In particular, everyone can use some help sharpen their communication skills (and improving their grade) by visiting [UMD's Writing Center](#) and schedule an appointment with the campus Writing Center. If it would be helpful to have someone to talk to, visit [UMD's Counseling Center](#) or consult one of the many other [mental health resources on campus](#). The mental health and well-being of our students and colleagues is our collective responsibility. We pledge to be flexible, respectful, and empathetic with each of you as we work together to learn the fascinating topic of Ecology.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit [UMD's Division of Student Affairs website](#) for information about resources the campus offers you and let your instructors know if we can help in any way.

Participation

- Given the interactive style of this class, attendance will be crucial to note-taking and thus your performance in this class. Attendance is particularly important also because class discussion and group work will be critical components for your learning.
- Each student is expected to attend and make substantive contributions to the learning experience.
- Students with a legitimate reason to miss a live session should communicate in advance with the instructor, except in the case of an emergency. An excused absence is an absence for which the student has the right to receive - and the instructor has the responsibility to provide - academic accommodation.
- Students who skip a live session are responsible for learning what they miss from that session.
- Additionally, students must complete all readings and assignments in a timely manner in order to fully participate in class.

Course Evaluation

Please submit a course evaluation through Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to CourseEvalUM is confidential. Campus will notify you when the website is open for you to complete your evaluations for fall semester courses. Please go directly to [Course Experiences](#) to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through [Testudo](#), the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

Copyright Notice

Course materials are copyrighted and may not be reproduced for anything other than personal use without written permission.

Tips for Success

- Attend and fully participate with ALL lectures and discussions.
- Print the lecture outlines and write notes on these sheets, so you can worry less about spelling and other basic information. Do not try to write everything down, but filter and distill the most important concepts and lessons that will trigger your memory as you review your notes, the readings, and the Panopto recordings.
- Answer and write out the study questions from each outline, do not merely review them. Active writing makes a giant difference for comprehension and in preparation for exams. Plus, some of the study questions (and quiz & clicker questions) will make their way on to the exams.
- Keep up. The structure of the course (e.g., with regular quizzes) is designed to help you with this! It is very difficult to perform well on the exams if you have not kept pace.
- While we hope to challenge your higher-level thinking and reasoning in this course, it is also essential that you learn the basic vocabulary of ecology. Therefore, try to memorize the key terms (listed on outlines) and their meaning so that you understand concepts as they arise (flash cards are useful for this; your text website has a 'flash card' feature).
- Consider participating in a study group set up with your peers. If you are successful in teaching this material to someone else (correctly), you have probably mastered it. Note, however, that while such groups are valuable, they do not substitute for individual time spent engaging with the material.
- Being a full-time student is a full-time job. To perform well, expect to spend about twice the time you spend in class (8 hours or more per week) working on BSCI 361 material and assignments outside of class.
- Do not hesitate to ask for assistance, show up for office hours, and/or make an appointment with the instructor or teaching assistant.