Principles of Ecology (11:216:351) Spring 2025
Mon. & Thurs. 8:30 – 9:50
Hickman 101

Instructors:
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Dr. Paul Walberg, paul.walberg@rutgers.edu
Dr. John Wiedenmann ENR 125, John.Wiedenmann@Rutgers.edu
Note: the ENR building is at 14 College Farm Road, Cook Campus

Office Hours: By appointment; Zoom or in person.

Course Description:

Principles of Ecology is a comprehensive introductory course about ecological interactions among organisms and their environments. Principles of Ecology will introduce basic ecological concepts and will describe the relevance of those concepts to problems arising from human activities, such as overharvesting, eutrophication, biological invasions, habitat loss, and climate change. Principles of Ecology is open to all who have completed a general biology course equivalent to Rutgers' General Biology 1 and 2 (119:115 and 119:116). The presentation of the course will assume that students recall and understand basic biological principles, or that students know where to look to refresh their memories. Basic biology, including introductory ecology, can be reviewed at two excellent websites: http://www.course-notes.org/biology/slides/campbells_biology_8th_edition and http://www.easynotecards.com/book/39vMSgAACAAJ. Introductory knowledge of mathematics, chemistry and physics will be necessary for some topics covered in the course.

Course Objectives:

Principles of Ecology will provide students with a comprehensive introduction to the science of ecology and why ecology matters – why ecology matters in the field of biology; why ecology matters in day-to-day human life; why ecology matters in supporting the foundations of human society. Upon successful completion of the course, students should begin to understand:

1) the breadth of the discipline of ecology and the integrative nature of the field. Key concepts include physiological constraints on potential distributions of organisms; energy flow; evolution in the face of ecological interactions; ecological constraints on actual distributions of organisms; population growth; ecological interactions within communities of species; causes and consequences of species diversity; acquisition and transfer of nutrients; sound strategies for conservation and management; and implications of global change.
2) the diversity of interactions between organisms and their environments, with a particular focus on general ecological interactions, both abiotic and biotic, that allow organisms to live and thrive in environments ranging from hot to cold, wet to dry, tropical to polar, terrestrial to aquatic, and marine to freshwater.
3) why a basic level of ecological knowledge is critically important for the well-being of humanity, especially in the face of world population growth, increasing urbanization, pervasive use of and pollution by synthetic compounds (including plastics), and climate change. Ecological literacy is an essential part of being an informed citizen of planet Earth.

Required Text: Bowman and Hacker. *Ecology*, 6th edition (Oxford Univ Press)

Lectures will be closely linked to chapters of the textbook, and the course will cover all chapters. Thus, **it is essential that you acquire a copy of the textbook for your own use**. The textbook is currently available in several formats, ranging from traditional hardbound to online rental. Print and digital options are available. Price options – and affordability – vary accordingly. (Note: the 5th and 4th editions of this textbook can be used, but the student is responsible for all discrepancies in page numbers between the 6th and earlier editions.)

Lectures will be closely linked to particular chapters of the textbook. The schedule of readings is ambitious (see below), and it is very important not to fall behind. To optimize your likelihood of performing your best, you will need regular access to the textbook. Weekly quizzes will be given as incentive to keep up with lectures and assigned readings. The total point value of quizzes will be equivalent to a full midterm examination.

Lecture Slides

In-class instructional materials will include PowerPoint slides and videos, both of which will be extensively supplemented by the commentary of the lecturer. Lecture slides typically contain less than half the information conveyed in lecture. Succeeding in this course requires taking your own notes that summarize what you are learning in your own words and diagrams. This recommendation is well-supported by research on learning.

Evaluation:

Evaluation will be based on three multiple-choice examinations (two exams duringperiods of the semester (@100 points), one final exam(@150 points), and ten weekly quizzes, each valued at 10 points (100 total quiz points). Thus, the final grade will be based on a total of 450 points. Extra credit will not be offered.

Exams: Two exams will be given via Canvas during regularly scheduled class periods (see lecture schedule), and the final exam will be given via Canvas during the regularly scheduled final examination period. **The exams will be 'closed-book' and will require LockDown browser. Books, notebooks, and other aids will NOT be allowed during exams.** Each exam will cover the preceding eight or nine lectures. The final exam will be partially comprehensive. It will cover the final nine lectures, and 1/3 of the final exam will cover material from the first two sections of the course (i.e., from the first two exams).

Quizzes: Quizzes will be administered via Canvas nearly every week except for exam weeks. Each quiz will be valued at 10 points, totaling 100 quiz points over the semester. In other words, **the quizzes in total have the same point value as one full hour exam**. Quizzes will allow use of open books and open notebooks and will cover lecture material and assigned readings. (Recall that exams will NOT allow books, notebooks, or any other materials.) Quizzes may include several question formats: multiple choice, fill-in-the-blank, true-false, numeric responses, and some calculated responses. Each quiz will be 'open' for two or three hours and will be available on-line for several days.

All quizzes will be counted; no quizzes will be dropped.

Grading Scale:

Final grades will be based on a total of 450 points. No extra credit will be available. At a minimum, you must earn 225 points to earn a passing grade. The intent is to assign letter grades on a strict percentage basis, where cutoffs are A = 90%, B+ = 87%, B = 80%, C+= 77%, C = 70%, D = 50%, and F < 50%.

PRINCIPLES OF ECOLOGY (216:351) LECTURE SCHEDULE, SPRING, 2025

Date	Lecture	Ch.	Topic	Lecturer
Jan-23	1	1	Introduction; What Ecology Is, and Why Ecology Matters	John-Alder
Jan-27	2	2	The Physical Environment	Wiedenmann
#Jan-30	3	3	The Biosphere	John-Alder
*Feb-3	4	4	Environmental Variation: Temperature and Water	John-Alder
#Feb-6	5	4,5	Environmental Variation: Energy	John-Alder
*Feb-10	6	5	Environmental Variation: Energy	
#Feb-13	7	6	Evolution and Ecology	John-Alder
*Feb-17	8	7	Life Histories	John-Alder
Feb-20	9	8	Behavioral Ecology	John-Alder
Feb-24			**Exam 1**	
#Feb-27	10	9	Population Distribution and Abundance	Walberg
*Mar-3	11	10	Population Dynamics	Walberg
#Mar-6	12	11	Population Growth and Regulation	Walberg
*Mar-10	13	12	Predation	Walberg
Mar-13	14	12,13	Predation & Parasitism	Walberg
Mar-17			**No Class - Spring break**	
Mar-20			**No Class – Spring Break**	
Mar-24	15	14	Competition	Walberg
#Mar-27	16	15	Mutualism and Commensalism	Wiedenmann
*Mar-31	17	16	The Nature of Communities	Wiedenmann
Apr-3			**Exam II**	
Apr-7	18	17	Change in Communities	Wiedenmann
#Apr 10	19	18	Biogeography	Wiedenmann
*Apr 14	20	19	Species Diversity in Communities	Wiedenmann
#Apr-17	21	20	Production	Walberg
*Apr-21	22	21	Energy Flow in Food Webs	John-Alder
#Apr-24	23	22	Nutrient Cycling	Walberg
*Apr-28	24	23	Conservation Biology	Wiedenmann
#May-1	25	24	Landscape Ecology	Wiedenmann
*May-5	26	25	Global Ecology	Wiedenmann
May-12			**12:00PM – 3:00PM**	**Hickman 101**

#indicates that a quiz will open at 5:00PM on this date
***Indicates that a quiz will close at 8:00AM on this date**