

Biology 345
COMMUNITIES AND ECOSYSTEMS

January 2022

Instructor: Dr. Barry R. Taylor

Office: JBB 315 (Hours: After each lecture or any time I am near a computer)

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Lecture: JBB 236

Blocks B1-B3: Monday 9:15, Wednesday 8:15 (*yawn*), Thursday 10:15

This course has no laboratory (stop pretending you're disappointed)

Course Objectives: An outline of the essential theory of community and ecosystem ecology, including climate drivers, mineral cycles, energy flow and community structure. The concepts of species interactions, succession, food webs and biodiversity are illustrated with comparative examples drawn from a variety of aquatic and terrestrial ecosystems. The pervasive influence of humanity on global ecological processes is considered throughout the course.

Course Text: Chapin, F.S., Matson, P.A. and Vitousek, P. 2011. Principles of Terrestrial Ecosystem Ecology. Second edition. Springer-Verlag, New York, NY. 544 pp.

Prerequisites: Biology 201, 202 and 203.

Evaluation: Midterm examination	20% (Thursday, 3 March, 10:15 a.m.)
Final examination	35% (Date pending)
Assignments (4, plus 2 quizzes)	20% (Every two weeks)
Term paper	25% (Due Friday, 25 March)

Note: The first two weeks of lectures this term will be delivered as self-study modules on Moodle. You will be asked to write a brief quiz on Thursdays to test your understanding of the week's material. See details on following page.

Term Paper

1. Each student is required to write a review paper on some aspect of community or ecosystem ecology relevant to this course.
2. The paper is to be written in the style of a *critical review* in formal journal format, and must cite *at least 10* relevant papers from the primary literature. Some suggestions for review topics will be supplied, but students are responsible for choosing their own topics.
3. The topic chosen must be approved by the course instructor by Friday, 26 February. The finished paper is due in class on Friday, 25 March.

Quizzes and Assignments

1. The first two weeks of classes this year are being given as self-study modules, based on illustrated course notes and videos. At the end of each week you will be given a 10-minute quiz, also delivered through Moodle. The quizzes will consist of two, short-answer questions based on the course notes. Each quiz will be available at the beginning of the Thursday class time (10:15 to 10:30) and each will contribute 2% to your final grade.
2. A total of four critical reading assignments are to be completed over the course of the term, after the first two weeks.
3. For most assignments, the class will be assigned a recent theoretical paper in a subject germane to the course. Students must read the paper and *briefly* answer a few questions based on the ideas it presents. Each assignment should be no longer than two double-spaced pages.
4. Be aware that the pandemic situation is fluid, and a delay of in-person classes beyond the first two weeks is possible. All aspects of the syllabus should be considered tentative. You will be given as much warning as possible of any changes.



There is three errors in this sentence; can you find them?

Lecture Schedule

<u>Lecture</u>	<u>Date</u>	<u>Topic</u>	<u>Text Reference</u>
1	M 17 Jan	Introduction; Definitions [Self-study]	1-10
2	W 19	Properties of Ecosystems [Self-study]	11-21
3	Th 20	Climate: Atmospheric Circulation [Self-study]	23-37
4	M 24	Weather: Local Atmospheric Systems [Self-study]	38-41
5	W 26	Environments of the Earth [Self-study]	50-61
6	Th 27	The Water Cycle [Self-study]	100-121
7	M 31	Primary Production on Land	Chapter 6, 208-214
8	W 2 Feb	(Continued)	
9	Th 3	Primary Production in Water	129-134, 162-168
10	M 7	(Continued)	
11	W 9	Decomposition	Chapter 7
12	Th 10	Trophic Dynamics on Land	Chapter 10
13	M 14	(Continued)	
14	W 16	Trophic Dynamics in Water	
15	Th 17	Food Chains and Food Webs	Chapter 10
	M 21	[Study Week]	
16	M 28	Indirect Interactions	
17	W 2 March	(Continued)	
	Th 3 March	MIDTERM EXAMINATION	
18	M 7	Trophic Cascades	305-306, 328-329
19	W 9	The Diversity Controversy	330-334
20	Th 10	Diversity Effects on Ecosystem Properties	
21	M 14	Species Identity	Chapter 11
22	W 16	(Continued)	
23	Th 17	Biogeochemical Cycles	Chapter 9
24	M 21	Terrestrial versus Aquatic Element Cycles	Chapter 9
25	W 23	Human Effects on Biogeochemical Cycles	414-421
26	Th 24	(Continued)	
27	M 28	Succession Reconsidered	346-351, 357-366
28	W 30	(Continued)	
29	Th 31	Succession and Ecosystem Development	288-303
30	M 4 April	Alternate Stable States	340-346
31	W 6	(Continued)	
32	Th 7	Landscape Ecology: The Patch Mosaic Model	Chapter 13
33	M 11	Human Effects on Ecosystems	Chapter 15
34	W 13	Ecosystem "Health" and Degradation	Chapter 15
35	Th 14	Ecosystem Restoration	Chapter 15
