

ECOLOGY and EVOLUTION
Biology 270

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Lecture 225 Carnegie
Mon. Wed. 0930-1050

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“Science is facts. Just as houses are made of stones, so is science made of facts. But a pile of stones is not a house and a collection of facts is not necessarily science.” Henri Poincare (1854-1921) (French Mathematician)

Course Description: The goal of this course is to introduce you to the basic principles of ecology and the process of ecological inquiry. By the end of this course you should understand the biological and evolutionary processes that determine the distribution and abundance of species and ecosystem structure and function. This goal will be reached by examining increasingly more complex components of ecosystems. Principles discussed in class will be emphasized in laboratory investigations. In both lecture and laboratory, the methods used by ecologists to observe, interpret, and report natural phenomena will be stressed.

Lecture: Lecture will meet Monday and Wednesday 0930-1050 in Carnegie 225. The syllabus has the tentative schedule and any changes will be announced in class and via e-mail; it is your responsibility to stay informed.

Class Decrees:

1. Arrive on time or wait until break to enter class.
2. No electronics (computer, iphone, ipad etc.) in class.
3. No falling asleep in class.
4. Late work will not be accepted.

Readings:

Text: Bowman, Hacker, & Cain 2017 *Ecology 4th Edition*, Sinauer Associates, Inc.

Supplementary Writing Guide: Hofmann, A.H., 2016. Writing in the Biological Sciences. 2nd Edition

Articles: Assigned articles listed under “Reading” on the schedule can be accessed on line; full citations are at the end of the syllabus. These articles will not be on Lyceum. You should study these articles as you do the text as they will be discussed in lecture and/or lab. Additional articles may be assigned.

Laboratories: The laboratory focuses on three investigations: pine tree demography, rocky intertidal community, and acid rain. You are expected to read and be familiar with the lab exercises **prior** to lab and to have the appropriate clothes and supplies as detailed in the laboratory manual. Failure to be adequately prepared may preclude your participation. The pine lab and rocky intertidal lab involve field trips that leave **promptly** at the designated times (**see dates and times in the laboratory manual**). The same collaborative writing/peer review system as used in Bio 242 will be used for the pine tree and acid rain labs. Students are expected to work independently on these investigations during the time between labs.

Office Hours: I don’t have regular office hours and am not on campus every day. If you need to see me, please either catch me after class or lab or make an appointment.

Communication: Many communications in this course will be transmitted via e-mail. You are subscribed to the mailing list (wbio270a@lists.bates.edu) and it is your responsibility to keep abreast of information on e-mail.

Lecture Assessments: There will be two lecture assessments, a midterm and a final. The final assessment is comprehensive.

Course Grade Determination: Your course grades will be computed according to the weighted percentages below:

Mid-Term Exam	20%
Final Exam	30%
Laboratory	50% (15% each for pine and acid rain lab reports; 10% rocky intertidal lab 8% statistics homework, 4 @ 2% each; 2% other lab work.)

Class and lab participation/preparation will be considered in final grade determination.

To pass this course, you must have passing grades **both** in the laboratory assignments and in the lecture assessments; that is, in **each** portion, your **grade must be > 55%**. Excellence in one area will not offset a failing grade (< 55%) in the other. This is the same rubric used in Bio190 and Bio 242.

Learning Differences: If you have any issues or learning differences that affect how you learn, please let us know as soon as possible, provide documentation, and see also the Dean of Student's office. If you require alternate arrangements for testing please see me at least **two weeks before** the first exam with appropriate documentation.

Campus resources: While college is an exciting experience, there are times when you may find yourself dealing with issues related to academic performance, identity, community, and family. The Biology 270 faculty and staff are not just your instructors; we are also mentors and resources. We always encourage you to come see any one of us for help, and if we cannot help you directly we can put you in touch with someone who can. Meanwhile, there are a number of great resources on our campus:

Office of Student Affairs: <http://www.bates.edu/student-affairs/>

Office of Intercultural Education: <http://www.bates.edu/oie/about-2/>

The Health Center: <http://www.bates.edu/health/>

International Student Programs: <http://www.bates.edu/student-affairs/student-support-and-advising/international-students/>

Academic Honesty – Read this!

Academic integrity is fundamental to learning, scholarship, and indeed all dimensions of academic life. At its simplest, this means that the work you submit must be your own unless collaboration is specifically allowed, that you use only those resources allowed; that you express yourself in your own words unless you are quoting, and that you properly acknowledge and cite the ideas, information, and other work that you used or that contributed to your understanding.

Your academic work is governed by The Bates College Statement on Academic Integrity, found here at:

<http://www.bates.edu/student-affairs/student-conduct/academic-integrity-policy/>

and following scientific writing conventions as outlined in the Department of Biology's "How to Write" guide or Hofmann (2016). The Statement on Academic Integrity provides a fuller discussion of academic integrity and definitions of plagiarism, misuse of sources, and cheating. You are responsible for reading the Statement carefully and abiding by its terms.

Your instructors consider cheating or plagiarism of any form in this class to be a serious violation of the above policy. Depending on the circumstances of the violation, we will assign a failing grade for the assignment and/or the course, require work to be redone, and/or impose other consequences; in addition, we will refer the matter to the Dean of Students for possible institutional action. Procedures for suspected violations are explained here:

<http://www.bates.edu/student-affairs/student-conduct/student-conduct/>

Some work in this course is collaborative (e.g. lab papers, in class problems), meaning that you may consult with peers on completing assignments. Other assignments are to be done individually. For each assignment we will indicate to what extent you are allowed to collaborate.

Part of academic honesty is utilizing sources correctly, but this can often be confusing for beginning college students. Excellent resources on utilizing sources correctly can be found here:

http://www.bates.edu/writing/files/2011/06/Guide_to_Working_with_Sources_August_2013_print.pdf.

Additionally, you will be taught in this class how to properly use citations in your written and oral work. Contact an instructor if you have any questions about these policies.

Information and misinformation abound on the Web. The Web can be a valuable resource and a good place to get started on investigating a subject, but it can also be misleading. In general, a web page is not an acceptable citation. If you have a question about the validity of a website or information derived from a website, please see one of us.

DATE	TOPIC	READING¹
8 January	Course Introduction What is Ecology? How many species are there? How do we know? Measures of Diversity; Review 5 Kingdoms	Ch. 1, May 2002
10 January	Evolution I: Natural Selection & Hardy-Weinberg	Ch. 6 (132-148)

15 January	Martin Luther King Day, No Class	
17 January	Writing Specialist (Results and Discussion)	

22 January	Statistics I	Web site: "Painless guide to statistics" ²
24 January	Evolution II: Variation & Speciation	Ch. 6 (148-159)

29 January	Populations: Age Parameters & Measurements	Ch. 9
31 January	Population Growth & Regulation	Chs. 10 & 11

5 February	Survivorship & Life Tables	
7 February	Life History	Ch. 7, Commito 1982

12 February	MID-TERM EXAM	
14 February	Life & Fecundity Tables	

17-25 February	BREAK	

DATE	TOPIC	READING¹
26 February	Competition	Ch. 14
28 February	Predation: Models, studies, functional response	Ch. 12

5 March	Community Structure Top -down and bottom -up organization	Ch. 16, Carpenter et al. 1987
7 March	Succession: Patterns	Ch. 17

12 March	Succession: Mechanisms	Gallagher et al. 1983
14 March	Island Biogeography: Patterns, Parks, Preserves	Ch. 18, Ch. 24 (552-560)

19 March	Climate & Terrestrial Biomes	Chs. 2 & 3 (50-70)
21 March	Aquatic Biomes	Ch. 3 (70-83)

26 March	Ecosystem Energetics	Chs. 20 & 21
28 March	Biogeochemical Cycles	Ch. 25 Falkowski et al. 2000

2 April	Climate Change I	Ch.24; Broecker 2003; Marra <i>et al.</i> 2005
4 April	Climate Change II	

COMPREHENSIVE FINAL EXAM: Friday 13 APRIL AT 0800-1000

¹ Where text pages are assigned, begin and end with section titles on first and last pages respectively.

Assigned Reading

- Broecker, W.S. 2003. Does the trigger for abrupt climate change reside in the ocean or in the atmosphere? *Science*, 300: 1519-1522.
- Carpenter, S.R., J.F. Kitchell, J.R. Hodgson, P.A. Cochran, J.J. Elser, M.M. Elser, D.M. Lodge, D. Kretchmer, X. He, and C.N. von Ende 1987. Regulation of lake primary productivity by food web structure. *Ecology* 68:1863-1876.
- Commito, J.A. 1982. Effects of *Lunatia heros* predation on the population dynamics of *Mya arenaria*, and *Macoma balthica* in Maine, USA. *Marine Biology* 69:187-193.
- Falkowski, P., Scholes, R.J., Boyle, E., Canadell, J., Canfield, D., Elser, J., Gruber, N., Hibbard, K., Högberg, P., Linder, S., Mackenzie, F.T., Moore, B., III, Pedersen, T., Rosenthal, Y., Seitzinger, S., Smetacek, V. and W. Steffen. 2000. The global carbon cycle: A test of our knowledge of earth as a system. *Science*, 290: 291-296.
- Gallagher, E.D., P.A. Jumars and D.D. Trueblood. 1983. Facilitation of soft-bottom benthic succession by tube builders. *Ecology* 64:1200-1216.
- Marra, P.P., Francis, C.M., Francis, R.S. Mulvihill, and F.R. Moore 2005. The influence of climate on the timing and rate of spring bird migration. *Oecologia* 142:307-315.
- May, R.M. 2002. The future of biological diversity in a crowded world. *Current Science* (Bangalore) 82:1325-1331.