

BIOL 285 Ecology (4 Credits)
Professor Mark Davis
Office: OlinRice 219; 696-6102
Office Hours M: 1:30-3:00, Wed: 1:30-3:00

Fall 2009
Macalester College

GENERAL INFORMATION

Biology 285 (Ecology) is a comprehensive introductory ecology course. Students will be introduced to the principal ideas and theories currently engaging population, community, and ecosystem ecologists. Students also will examine a variety of environmental problems from an ecological perspective. The course encompasses both terrestrial and aquatic systems, however it emphasizes terrestrial systems. Plant and animal ecology receive approximately equal treatment.

In addition to reading and hearing about ecology, students will have the opportunity to conduct field sampling and research. During several field problems, students will learn field techniques used by ecologists--observation, measurement, sampling, and analysis. Students will also be introduced to writing in a scientific manner and other ecological tools, e.g., experimental design, statistics, and computer modeling. This syllabus and other course materials can be found on Moodle.

REQUIREMENTS SATISFIED: This course is required for a Biology Major. It also meets course requirements for a Biology Minor, one of the natural science requirements for an Environmental Studies Major, and 4 credits of the college's Natural Science Requirement.

TEXTS: Cain, Bowman, & Hacker (2008) Ecology; and other readings to be assigned.

LECTURES/DISCUSSIONS: MWF 9:40-10:40 a.m. in OlinRice 284. Please come to class before 9:40. Coming to class late is disruptive and inconsiderate, and you will miss important information.

LABORATORY/FIELD TRIPS: Tu 8:00-11:10 a.m. We will use the weekly laboratory time to engage in a variety of activities, including field studies, field trips, workshops in statistics and computer modeling, student presentations, and exams.

WRITING, EXAMINATIONS, AND GRADING: There will be 3 exams--2 exams during the term and a final exam (100 points each). Several of the laboratory activities will require write-ups and these will be graded as well. There will be a final project resulting in a 2 page executive summary and an oral presentation. In addition, students will write several memos to one another on issues raised in the course. Students will be evaluated on their performance on exams (50%), their laboratory write-ups (30%), their final project (15%), and their participation in class discussions and memo writing (5%). Attendance at labs/field trips is required and any missed labs will result in a 20 point deduction from the semester total. Attendance at lectures and class discussions is highly recommended. Each missed discussion will result in a 5 point deduction from the semester total. The final exam is scheduled for Monday, December 21, 8:00-10:00 a.m. Students must arrange their end of the semester travel arrangements so that they can take the exam when it is scheduled. Note: if you have need for special test-taking or note-taking accommodation, please feel free to discuss this with Professor Davis.

SCHEDULE OF TOPICS

Readings from Cain, Bowman, and Hacker

September	9	Introduction	pages 2-18
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THE EVOLUTION PARADIGM

11	Population Genetics	130-151
14	Population Genetics (continued)	
16	Natural Selection	
18	Evolution and Speciation	

COMMUNITY ECOLOGY

21	Overview and Environmental Gradients	322-339, 388-393	
23	Succession, Role of Inhibition, and Facilitation	346-356, 358-351	
25	DISCUSSION (Memos Due)		
28	Disturbance, Predation, Equilibrium, Climax Communities,	342-346, 396-403	
30	Competition and Resource Partitioning	240-258, 393-396	
October	2	Patterns of Species Diversity and Alternative Stable States	356-358,
	5	Island Biogeography and Regional Processes	364-385
	7	DISCUSSION (Memos Due)	
	9	No Class (International Roundtable)	
	12	Review for Exam #1	
	13	EXAM #1	

POPULATION ECOLOGY

14	Population Growth	196-207
16	Population Growth (continued)	
19	Limits to Population Growth	207-225, 274-282
21	Persistence, Extinction, and Metapopulations	225-235, 482-490
23	DISCUSSION (Memos Due)	
26	Invasive species	
28	Predation/Herbivory	260-274

29-Nov 1 FALL BREAK

November	2	Living in Groups	
	4	Coevolution, Parasitism, and Mutualism	282-318

AUTECOLOGY

	6	Energy Budgets and the Principal of Allocation	
	9	Life Histories	154-172
	11	Reproductive Syndromes, Dispersal and Dormancy	
	13	DISCUSSION (Memos Due)	
	16	Review for Exam #2	
	17	EXAM #2	

LANDSCAPE AND ECOSYSTEM ECOLOGY

	18	Primary and Secondary Production and Energy Flows	412-449
	20	Primary and Secondary Production (continued)	
	23	Nutrient Cycling	454-474
	25	Interaction between ecosystems processes and community patterns	403-407

Thanksgiving

	30	Nutrient Cycling and Landscape Patterns at Global and Multiple Scales	502-510, 526-533
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ENVIRONMENTAL ISSUES: AN ECOLOGICAL APPROACH

December	2	DISCUSSION (Memos Due)	
	4	Global Atmospheric Issues	533-541
	7	Global Atmospheric Issues (cont)	
	9	Cultural Eutrophication	544-545
	11	DISCUSSION (Memos Due)	
	14	Toxic Wastes & Final Thoughts	
	21	FINAL EXAM (8:00-10:00 a.m.)	

LABORATORY/FIELD STUDY SCHEDULE

<u>Date</u>	<u>Site</u>	<u>Objective/Focus</u>
9/15	Ordway	Field Study #1. <u>Ecological change over time and space</u> (Orientation and field data collection)
9/22	Ordway	Field Study #1. (Field data collection continued)
9/29	Ordway	Field Study #1. (Field data collection completed)
10/6	Ordway	Field Study #2. <u>Diversity and Distribution</u> (Orientation and field data collection)
10/13	OlinRice	Exam #1
10/20	Ordway	Field Study #2. (Field data collection completed)
11/3	OlinRice	Biostatistics and Graphics Lab
11/10	OlinRice	Work on Data Analysis for Field Study #2
11/17	OlinRice	Exam #2
11/24	OlinRice	Introduction to Ecological Modeling
12/1	Olin Rice	Management and Habitat Restoration Exercise (Orientation for Final Project)
12/8	OlinRice	Student Oral Presentations of Final Project