

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 2013
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. 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 (2011) Ecology; and other readings to be assigned. In addition, for two topics we will be using a software substitute for the book. *Note that the text (Cain et al.) is part of MCSG's Textbook Reserve Program. A number of copies of the textbook are on reserve in the DeWitt Wallace Library available for checkout for a period of 2, 24 or 48 hours. Textbooks are available at the main circulation desk.*

LECTURES/DISCUSSIONS: MWF 8:30-9:30 a.m. in OlinRice 250. Use of laptops or other electronic devices is not permitted in class unless as part of a college approved accommodation. Please come to class before 8:30. Coming to class late is disruptive and inconsiderate.

LABORATORY/FIELD TRIPS: Tu 8:00-11:10 a.m., 1:20-4:30. 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 Wednesday, Dec. 11 at 8:00 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, et al. pages
September	4	Introduction	
<u>THE EVOLUTION PARADIGM</u>			
	6	Population Genetics	132-144
	9	Natural Selection	
	11	No Class	
	13	Evolution and Speciation	144-151
<u>COMMUNITY ECOLOGY</u>			
	16	Overview and Environmental Gradients	388-392
	18	Succession, Role of Inhibition, and Facilitation	343-357, 359-363
	20	DISCUSSION (Memos Due)	
	23	Equilibrium, Nonequilibrium, and Climax Communities	397-407
	25	Patterns of Species Diversity and Alternative Stable States	323-336, 357-
	27	Competition and Resource Partitioning	240-252, 255-259, 393-397 359
	30	Effects of Disturbance and Predation	336-341
October	2	DISCUSSION (Memos Due)	
	4	Island Biogeography and Regional Processes	364-387, 508-513
	7	Review for Exam #1	
	8	EXAM #1	
<u>POPULATION ECOLOGY</u>			
	9	Population Growth	SimUText software
	11	Population Growth (continued)	
	14	Limits to Population Growth	SimUText
	16	Limits to Population Growth (continued)	
	18	DISCUSSION (Memos Due)	
	21	Persistence, Extinction, and Metapopulations	229-238, 476-499
	23	Non-Native and Invasive species	

Fall Break

	28	Predation/Herbivory	262-264, 271-275
November	30	Coevolution and Mutualism	305-320
	1	DISCUSSION (Memos Due)	

LIFE HISTORIES AND PHYSIOLOGICAL ECOLOGY

	4	Energy Budgets and the Principal of Allocation	
	6	Life Histories	156-174
	8	Reproductive Syndromes, Dispersal and Dormancy	
	11	Review for Exam #2	
	12	EXAM #2	

LANDSCAPE AND ECOSYSTEM ECOLOGY

	13	Primary and Secondary Production and Energy Flows	410-449
	15	DISCUSSION (Memos Due)	
	18	Primary and Secondary Production (continued)	
	20	Nutrient Cycling and Interaction between Ecosystem Processes and Community Patterns	SimUText software
	22	Nutrient Cycling and Landscape Patterns at Global and Multiple Scales	501-508, 525-532

ENVIRONMENTAL ISSUES: AN ECOLOGICAL APPROACH

	25	Global Atmospheric Issues	532-539
	27	Global Atmospheric Issues (cont)	

Thanksgiving

December	2	Cultural Eutrophication	540-543
	4	Acid Rain	539-540
	6	DISCUSSION (Memos Due)	
	9	Toxic Wastes & Final Thoughts	
	11	FINAL EXAM (8:00-10:00 a.m.)	

LABORATORY/FIELD STUDY SCHEDULE

<u>Date</u>	<u>Site</u>	<u>Objective/Focus</u>
9/17	Ordway	Field Study #1. <u>Ecological change over time and space</u> (Orientation and field data collection)
9/24	Ordway	Field Study #1. (Field data collection completed)
10/1	Ordway	Field Study #2. <u>Diversity and Distribution</u> (Orientation and field data collection)
10/8	OlinRice	Exam #1
10/15	Ordway	Field Study #2. (Field data collection completed)
10/29	OlinRice	Biostatistics and Graphics Lab
11/5	OlinRice	Work on Data Analysis for Field Study #2
11/12	OlinRice	Exam #2
11/19	OlinRice	Prep/Work on Final Project
11/26	Olin Rice	Student Oral Presentations of Final Project
12/3	OlinRice	Student Oral Presentations of Final Project