

# **ECOLOGY (BIOL180/ENVI180)**

## **Macalester College -- Spring Semester 2008**

**Times:** Lectures are Monday, Wednesday and Friday, noon to 1:00 PM and labs on are Tuesdays

**Rooms:** Lectures will be held in Olin-Rice 100 and labs will meet in Olin-Rice 284

**Instructors:** Jerald Dosch, (dosch@macalester.edu; 651.696.6187; Olin-Rice 215)

**Office hours:** MWF 1:30-2:30 and by appointment

Mike Anderson, (andersonm@macalester.edu; 651.696.6230; Olin-Rice 217)

**Office hours:** by appointment most days

### **COURSE DESCRIPTION**

*Biology 180/Environmental Studies 180* (Ecology) is a comprehensive introductory ecology course. Students will be introduced to the principal ideas, theories and methodologies 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 other ecological tools, e.g., experimental design, statistics, and computer modeling.

### **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. This course carries a Q1 designation and therefore contributes to meeting the quantitative reasoning requirement for graduation.

### **COURSE TEXTBOOK**

Smith, T. M. and R. L. Smith. 2006. *Elements of ecology*, 6<sup>th</sup> edition. Pearson Benjamin Cummings, San Francisco, CA. {see also textbook web site at [www.ecologyplace.com](http://www.ecologyplace.com)}

### **COURSE MOODLE PAGE**

<http://moodle.macalester.edu/course/view.php?id=1146>

Please note that the course Moodle page will be updated on a regular basis during the semester. Be sure to check back periodically for updates and new information.

### **LECTURE FORMAT**

The class will meet three times per week and will be conducted with both lectures and in-class discussions. You are expected to have completed all assigned readings before coming to class, and be prepared to discuss them.

In addition to normal classroom conversation, there will be five days specifically dedicated to discussion of readings (see schedule below). You will be expected to prepare for each of these discussions by completing the assigned readings and writing a brief email response to three questions.

TENTATIVE LECTURE SCHEDULE (SUBJECT TO CHANGE)

<b>Date</b>	<b>Lecture Topic</b>	<b>Assigned Readings</b> (from Smith & Smith)*
M 28 Jan	Introduction; biology & ecology (life & connections)	Chapter 1
T 29 Jan	<b>First lab</b>	<b>Lab sessions meet in Olin-Rice 284</b>
W 30 Jan	The science of ecology; population genetics	Chapters 1 & 2
F 1 Feb	Population genetics	Chapter 2
M 4 Feb	Natural selection	Chapter 2
W 6 Feb	Evolution and speciation	Chapter 2
F 8 Feb	Physical environments and environmental gradients	Chapter 3 and pp 66-79, 82, 85-90, 100-101
M 11 Feb	Life histories: how to achieve the goal	Chapter 8
W 13 Feb	Life histories	Chapter 8
F 15 Feb	<b>Discussion I</b>	See <b>discussion 1</b> on class Moodle page
M 18 Feb	Properties of populations and metapopulations	Chapter 9 & pp 242-245, 253-255
W 20 Feb	Population growth	Chapter 10
F 22 Feb	Population growth	Chapter 10
M 25 Feb	Limits to population growth	Chapters 10, 11
T 26 Feb	<b>EXAM I</b> —taken during lab period	Everything up through & including 25 Feb
W 27 Feb	<b>Discussion II</b>	See <b>discussion 2</b> on class Moodle page
F 29 Feb	Competition and resource partitioning	Chapter 13
M 3 Mar	Coevolution, predation/herbivory	Chapter 14
W 5 Mar	Coevolution, parasitism, mutualism	Chapter 15
F 7 Mar	Community structure	Chapters 16 & 17
M 10 Mar	Community structure	Chapters 16 & 17
W 12 Mar	<b>Discussion III</b>	See <b>discussion 3</b> on class Moodle page
F 14 Mar	Community dynamics; succession	Chapter 18
17-21 Mar	<b>Spring Break—no classes</b>	
M 24 Mar	Community dynamics; succession	Chapter 18
W 26 Mar	Landscape patterns	Chapter 19
F 28 Mar	Island biogeography	Pp 252-253, 408-410, 649
M 31 Mar	Primary and secondary production, energy flows	Chapter 20
W 2 Apr	Primary and secondary production, energy flows	Chapter 20
F 4 Apr	<b>Discussion IV</b>	See <b>discussion 4</b> on class Moodle page
M 7 Apr	Decomp, nutrient cycling & biogeochemical cycles	Chapters 21 & 22
T 8 Apr	<b>EXAM II</b> —taken during lab period	Everything up through & including 7 Apr
W 9 Apr	Patterns of species diversity	Pp 520-522, 544-545, 562; chapter 26
F 11 Apr	Habitat loss & restoration	Chapters 26 & 28
M 14 Apr	Biodiversity & conservation	Chapters 26 & 28
W 16 Apr	Biological invasions	Pp 252-253, 338, 611-612
F 18 Apr	<b>Discussion V</b>	See <b>discussion 5</b> on class Moodle page
M 21 Apr	TBA	
W 23 Apr	Winter ecology	See class web page for links
F 25 Apr	Medical ecology	See class web page for links
M 28 Apr	Agricultural ecology and carbon cropping	Pp 278-9; see class web page for links
W 30 Apr	Global atmospheric issues—solutions?	Chapter 29; see also class web page for links
F 2 May	Human ecology: pop <sup>n</sup> s, resources & sustainability	Chapter 27; see also class web page for links
M 5 May	<b>Wrap up and final exam review</b>	See Moodle
Th 8 May	<b>Final Exam:</b> 10:30-12:30 AM in Olin-Rice 100	The entire semester is fair game

\* Note: The reading assignments listed above as “Smith & Smith” are from the course textbook. The listed readings may be supplemented with additional materials. I will announce all supplemental readings in class and post them on the course Moodle site. You are responsible for all readings. I also encourage you to keep up with the latest breaking ecology news. A great place to look is the “Science Times” section in each Tuesday’s *New York Times*.

## LABORATORY FORMAT

Lab sections will meet in Olin-Rice 284 on Tuesdays from 8:30-11:40 AM or 1:00-4:15 PM. **Labs will meet for the first time on Tuesday, 29 January—you must attend!** We will use the weekly laboratory time to engage in a variety of activities, including field studies, experimentation, field trips, workshops in statistics and computer modeling, student presentations, and exams.

## LABORATORY GOALS

### I. TYPES OF EXPERIENCES

- A. Observational Studies
- B. Experimental Studies
- C. Modeling

### II. TYPES OF SKILLS

1. Experimental design
2. Data collection
3. Data analysis
4. Literature review
5. Written and oral presentation

## EXAMS

There will be three exams for this course, two "mid-term" exams plus the final exam. They will cover material from lecture, activities, presentations and assigned readings. Attendance at all exams is required. Absence on an examination day will result in a grade of ZERO for that particular exam unless arrangements are made with Professor Dosch at least one day prior to the day of the exam. If you must miss an exam due to your own illness, a death in the family, or a family emergency, you must notify me in advance or within 24 hours after the exam. You will need to show me some form of documentation should such a situation arise and you return to class to make up an exam. No make-up exams will be given without written evidence of emergency, such as a doctor's note. Make-up exams will be different from the standard exam. Missing an exam without an excuse will result in a grade of zero for that exam.

## WRITTEN ASSIGNMENTS

You will write five short memos (1 to 2 pages) to fellow students throughout the semester, one due on each discussion day (see schedule above). They will be based on issues raised during the course or/and the assigned readings for that day's discussion and do not require any additional outside research. These memos should be your thoughtful presentation, reflection and evaluation of the issue. If you wish to use ideas or materials from other sources make sure that you use proper citation format. **Late memos will not be accepted.**

Several laboratory activities will also require write-ups. In addition, the final project will require both a written report and an oral presentation.

## ACADEMIC INTEGRITY

All students will be required to abide by the Macalester College academic integrity guidelines found at <http://www.macalester.edu/deanofstudents/deanofstudents/handbook/2007-2008/academicpolicies.html#integrity>. Instances of suspected academic dishonesty (cheating, plagiarism, and using the same paper in more than one course) will be handled as outlined in the guidelines.

**DISABILITIES**

If you have a documented disability, or any other needs you think may affect your ability to perform well in this class, please see me early in the semester so that arrangements can be made to accommodate your situation.

**GRADING**

Your final grade for this course will be determined by the number of points you accumulate throughout the semester. You will not be permitted to submit extra work in an attempt to raise your grade.

Attendance at labs and field trips is required.

Midterm Exams (2 @ 100 points)	200
Final Exam	100
Portfolio of memos and responses	20
Lab write-ups	120
<b>TOTAL POINTS</b>	<b>445</b>

**ADDITIONAL HELPFUL INFORMATION**

Mark Davis, Professor of Biology here at Macalester, has written a number of wonderful *Useful Flyers of Information* covering a number of “how to” topics related to reading and writing scientific literature. These resources can be found at <http://www.macalester.edu/%7Edavis/MADUFIs.htm>