

BioE 107: ECOLOGY Winter Quarter 2011

INSTRUCTORS:

James Estes	COH252A	jestes@ucsc	9-2820	Office Hours Tues 2-3pm (campus) Wed 3-4pm (LML)
Marm Kilpatrick	EMS A332	marm@biology	9-5070	Office Hours: Tue 2-3pm

TEACHING ASSISTANTS

Walter Heady	COH255	heady@biology	9-5783	Office Hours Wed 11am-12pm (campus) Mon 3-4pm (COH255)
Benjamín Weitzman	COH251	bpweitzm@ucsc.edu	9-2357	Office Hours: Thurs 10-11am (campus) Fri 2-3pm (LML)

COURSE WEBSITE: http://bio.research.ucsc.edu/people/esteslab/Ecology_2010/

REQUIRED TEXTBOOKS:

- 1. Ecology 2008, M.L. Cain, et al., Sinauer Press**
- 2. A Primer of Ecology (4th Edition) 2008, N.J. Gotelli, Sinauer Press**

LECTURE SCHEDULE AND READINGS (CA--Cain et. al.; GOT—Gotelli)

Tu Jan 4	INTRODUCTION/OVERVIEW (MK/JE) <ul style="list-style-type: none">• Course goals• What is ecology?• Importance of considering ecology from an evolutionary perspective• Case study across individuals/populations/communities/ecosystems
Th Jan 6	THE PHYSICAL ENVIRONMENT/THE BIOSPHERE (MK) CA 22-78
Tu Jan 11	PHYSIOLOGICAL ECOLOGY (MK) CA 82-127 (optional)
Th Jan 13	POPULATION ECOLOGY I: Exponential growth (MK) CA 204-7, 187, GOT 1-12
Tu Jan 18	POPULATION ECOLOGY II: Age structured growth (MK) CA 196-203, GOT 49-80
Th Jan 20	POPULATION ECOLOGY III: Density dependent growth (MK) CA 208-212, GOT 25-48

- Tu Jan 25 POPULATION DYNAMICS: Stochasticity, Metapopulations (MK)**
CA 218-235, GOT 13-18, 38-40, 81-96
- Th Jan 27 SPECIES INTERACTIONS I: Competition, Mutualism (MK)**
CA 240-257, 302-317, GOT 99-124
- Tu Feb 1 SPECIES INTERACTIONS: Predation, Parasitism, Herbivory (MK)**
CA 260-279, 282-299 (optional), GOT 125-152
- Th Feb 3 1st MIDTERM**
- Tu Feb 8 FOOD WEBS—INDIRECT EFFECTS AND TROPHIC CASCADES (JE)**
CA 432-453
- What is a food web?
 - Bottom up and top down
 - HSS and the Green World Hypothesis
 - Trophic Cascades—examples
 - Indirect effects of trophic cascades
- Th Feb 10 COMMUNITIES (JE)**
CA 322-341, GOT Chapt. 8
- What is a community?
 - Hierarchical controls of community composition
 - Assembly rules
 - Species filters
 - Biogeography
 - Do communities reach equilibrium?
 - Disturbance
 - Succession
- Tu Feb 15 ECOSYSTEMS (JE)**
CA 54-477
- Nutrient cycles
 - Biogeochemical cycling
- Th Feb 17 DIVERSITY (JE)**
CA 364-411, GOT Chapt. 7, 9
- Global patterns (latitudinal gradients)
 - Species-Area relationships
 - Island Biogeography
 - Controls (equilibrium and non-equilibrium theories)
 - Intermediate disturbance hypothesis
 - Keystone predation
 - Niche packing
 - Neutral models
 - Consequences (biodiversity and ecosystem function)
- Tu Feb 22 RESILIENCE AND STABILITY (JE)**
- Invasibility
 - Alternative stable states

Th Feb 24 CONNECTIVITY—LINKAGES ACROSS ECOSYSTEMS (JE)

- Material fluxes
- Process fluxes

Tu March 1 EVOLUTIONARY ECOLOGY (JE)

CA 130-145

- Evolutionary change
- Species interactions and evolution
- Coevolution
- The interplay between ecology and evolution

Th March 3 PALEOECOLOGY (JE)

- Why history matters
- Approaches and time scales—historical archives, the fossil record, genetics
- Carbon and photosynthesis
- The dinosaurs
- Extinction of megafauna
- Inferring the causes of ecological and evolutionary change

Tu March 8 MANAGEMENT AND CONSERVATION (JE)

CA 478-501

- Major drivers of degradation

Th March 10 2nd MIDTERM

Written paper—due at 5pm on 4 March

GOALS OF COURSE

The main goal of this course is to familiarize you with the important concepts in ecology. We will emphasize ideas, not the memorization of facts. You will learn from the following main sources—the lectures; associated readings from the texts; the reading of key papers from the primary scientific literature; study exercises; and the discussion sections. A second goal is to instill an understanding and appreciation of ecological diversity—the diversity of biological species; the diversity of ecosystems; the diversity of processes that act within those ecosystems; and the diversity of approaches employed by ecologists in their efforts to understand the workings of nature. A third goal is to instill an appreciation for the importance of ecology to human welfare. A final goal is to help you learn to think like an ecologist. The discussion of journal articles and the laboratory exercises are intended to help you develop the skills necessary to more critically evaluate the evidence for ideas and hypotheses, and to allow you to begin observing patterns in nature and formulating and testing your hypotheses about why these occur.

GRADING

% of final grade

Mid Term Exam	35
Final Exam	35
Problem set (from 1st part)	15
Final paper (from 2nd part)	15

NO ELECTRONIC OFFICE HOURS. We will not answer or discuss study questions via email. See us during office hours or check with your TAs if you have questions or need assistance.

STUDENTS WITH DISABILITIES WHO MAY NEED SPECIAL ACCOMMODATIONS. Please see (WHICHEVER OF US IS RUNNING THE CLASS DURING WEEK 1) as soon as possible during office hours or arrange by email for a telephone meeting.

DISCUSSION AND LAB EXERCISE SCHEDULE (To be posted)

Week 1	Jan 3-7	No Discussion Sections this week
Week 2	Jan 10-14	
Week 3	Jan 17-21	
Week 4	Jan 24-28	
Week 5	Jan 31- Feb 4	
Week 6	Feb 7-11	
Week 7	Feb 14-18	
Week 8	Feb 31-25	
Week 9	Feb 28- Mar 4	
Week 10	Mar 7-11	

DISCUSSION SECTIONS (Times and locations)

M	11:00AM-12:10PM	Heady	N. Sci Annex 102
W	09:30AM-10:40AM	Heady	N. Sci Annex 103
Th	08:30AM-09:40AM	Weitzman	N. Sci Annex 103
F	03:30PM-04:40PM	Weitzman	N. Sci Annex 103