

INTRODUCTION TO ECOLOGY & EVOLUTION

11:704:101 (3 credits)

WEBPAGE: www.rci.rutgers.edu/~ssukhdeo/

MTH 9:15-10:35

LOREE-022

Instructor:

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Course Objectives:

This course covers basic principles in evolution and ecology at an introductory level. The evolution section is meant to provide an understanding of natural selection and micro-evolutionary mechanisms, including how to interpret phylogenetic trees and current theories on human and plant evolution. The ecology section covers population ecology, community ecology, ecosystems, climate, biogeochemical cycling, global climate change, greenhouse effects and conservation ecology. Examples illustrating concepts will be from current studies from peer-reviewed scientific periodicals.

SAS Core Curriculum Learning Goals:

II: Areas of Inquiry

A: Natural Sciences

- e. Understand and apply basic principles and concepts in the physical or biological sciences.
- f. Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis.

Course Learning Goals:

e. Understand and apply basic principles and concepts in the physical or biological sciences.

- 1) Define the basic concepts in evolution, natural selection, microevolutionary mechanisms in plants and animals and sexual selection.
- 2) Define the history of human evolution, and be aware of current research directions in the study of human evolution.
- 3) Define the basic concepts of ecology and population ecology, specifically the concept of intra- and inter-specific competition and density-dependent and -independent factors.

4) Define the basic concept of community ecology, specifically predation, symbiosis, and food web.

f. Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis.

- 1) Apply the concepts of natural selection to evolutionary scenarios problems.
- 2) Estimate and evaluate problems specific to each of the ecological subareas, eg. interpretation of graphic and tabular data.
- 3) Apply the appropriate ecological formula to the analysis of ecological problems.
- 4) Synthesize data and arrive at an appropriate decisions about specific ecological and biogeochemical problems.

Suggested Textbook:

A textbook is **NOT** a requirement for this course. All tests will be based on lecture material and guest seminars. However, for those students interested in ecology and evolution, an excellent basic textbook is:

Michael L. Cain (2014) “**Ecology**”, 3rd Edition.
Sinauer Associates, Inc. [older editions are fine]

Requirements:

1. Exams: Multiple-choice format.
 - Exam I = 128 points
 - Exam II = 128 points
 - Exam III = 128 points
2. In-classes Quizzes: all 10 points each. Quizzes are all short answer format. The quizzes cover a section of the course.
 - Quiz 1: Pre-definition test: Define evolution
 - Quiz 2: Natural selection
 - Quiz 3: Evolutionary mechanisms
 - Quiz 4: Human evolution
 - Quiz 5: Post-definition test: Define Evolution & Pre-definition test: Define ecology
 - Quiz 6: Population ecology
 - Quiz 7: Community ecology
 - Quiz 8: Competition
 - Quiz 9: Food webs & Predation
 - Quiz 10: Biogeochemical cycling & Global climate change
 - Quiz 11: Post-definition test: Define ecology

3. Total class points:

$$\begin{array}{r} \text{Exams} = 384 \\ \text{In-class quizzes} = \underline{96} \\ \hline 480 \end{array}$$

Attendance:

Attendance is mandatory, especially for the in-class quizzes. There are no make-up quizzes. All quizzes are given at the beginning of the class. The student is responsible for all lecture material, including the guest lectures. Lecture notes are **NOT** posted online.

As of September 2011, Rutgers OIT has implemented Self-Reporting Absence website (<https://sims.rutgers.edu/ssra/>), however, students are still expected to know the material for exams and quizzes.

Special Needs:

Accommodations will be given to all students who submit an official letter from the Office of Disability Services.

INTRODUCTION TO ECOLOGY & EVOLUTION
11:216:101
SYLLABUS*

Date	Lecture	TOPICS	In-class Quizzes
1/21	1	Introduction	Pre-test
1/25	2	Evolution – Charles Darwin & Alfred Wallace I	
1/28	3	Evolution – Charles Darwin & Alfred Wallace II	Quiz 1
2/1	4	Natural Selection I	
2/4	5	Natural Selection II	
2/8	6	Evolutionary Mechanisms I	Quiz 2
2/11	7	Evolutionary Mechanisms II	
2/15	8	Evolution of Sexual Selection	
2/18	9	Evolution of Domestication-Animals	Quiz 3
2/22	10	Evolution of Domestication-Plants	
2/23	EXAM 1 (Lecture 2-9)		
2/29	11	Natural Selection – Humans I	
3/3	12	Natural Selection – Humans II	Quiz 4
3/7	13	Experimental Evolution	
3/10	14	Population Ecology	
	SPRING BREAK		
3/21	15	Population Growth	Quiz 5
3/24	16	Intraspecific Effects: Density-dependent & -independent effects	
3/28	17	Community Ecology	
3/31	18	Interspecific Competition	Quiz 6
4/2	EXAM 2 (Lecture 10-17)		
4/7	19	Symbiosis & Mimicry	
4/11	20	Food Webs	Quiz 7
4/14	21	Biomes	
4/18	22	Biogeochemical Cycles- Carbon	Quiz 8
4/21	23	Global Climate Change I	
4/25	24	Global Climate Change II	Quiz 9
4/28	25	Conservation Ecology I	
5/2	26	Conservation Ecology II	Post-test
5/10	EXAM 3 (Lecture 18-25)		

