

CABRILLO COLLEGE: Spring 2012
BIOLOGY 1C: Plant Biology and Ecological Principles

Instructor: Nicole Crane

Office #620

Office hours: MW 2:40-4:00, Thursday 12:40-1:40

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Textbooks:

1) 'Biology', Campbell and Reece, 9th Edition

Chapters should be read before class in order to follow lectures well. In addition, some handouts will be assigned for reading.

2) A photographic Atlas for the Botany Laboratory 6th Ed. Van de Graaff, Rushforth, Crawley

Course Description:

Biology 1C is an introductory botany and ecology course, intended for biology majors, emphasizing the structure, function, diversity, and ecology of plants, and major ecological principles as they apply to communities and populations. The course format consists of lectures, hands-on laboratory exercises, and local field trips.

*NOTE: this is a class that requires participation and time commitment. Many of our activities rely on teamwork, and labs are an integral part of the class.

Part I: Plant Biology. This part of the class explores the diversity of plants, including a look at their solutions to 'problems' presented by new opportunities, such as their move on to land. Plants are a critical component of our biosphere and we cannot really understand how the natural world works without an understanding of the role plants play. We can't appreciate that role unless we know something about how plants work, and how they evolved to where they are today. This portion of the class will delve into the biology of the primary producers of our planet (some of which are a combination of primary producers and consumers in one organism, and some, like the fungi, that take a whole other route to nutrition and metabolism). We will first look at some general concepts and plant evolution, and some plant physiology (reproduction, growth and nutrition). Then we look at plants (and 'relatives'), by major groupings, starting with those that still depend on water, and moving into those who have evolved to take full advantage of terrestrial life. We will tie our discussions closely to plant evolution and adaptation, and look at the unique characteristics of both extinct and (primarily) extant (still living) plants.

Part II: Ecology. Ecology is all about the interactions of living and non-living components of an ecosystem. Relationships between living things (competition, predation, symbiosis etc.) and their non-living environment (nutrient availability, temperature, water, soil type etc.) shape the world in which we all live in very significant ways. All things are interconnected, and if one thing is affected, it will affect others. Think of this not in terms of a chain with links where if one link is broken of course it will affect all links above and below it, but think of it rather in terms of a complex arrangement of links, with no beginning and no end. Depending on where the broken link is situated, and how many other links are connected to it, the effect of breaking it will be different, and it will affect the entire group of links in different ways. Ecosystems are similar. Some animals or plants, or the availability of some nutrients, might have a 'limiting' or major change affect on most other plants and animals in the system. *Interconnectivity* is the key word and concept to understanding ecology. In this section of the class we will explore what we know about ecology and ecosystem function. We will look closely at the role of plants, and will start with some basic underlying concepts of ecology,

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move in to community ecology (interactions between living things), and then ecosystems (primarily the non-living components of ecosystems). Then we'll go into population ecology (what affects populations and population growth and we'll end with an overview of conservation biology (an emerging field), and other kinds of fields ecologists can go into (the types of things they do and the types of jobs they can get).

****NOTE:** You will be responsible for knowing the steps involved in **Mitosis** and **Meiosis** and the major differences between them, as well as the basic differences between **Prokaryotes** and **Eukaryotes**, including **components** of each type of cell and their major functions. Also please review the basics of **Respiration** and **Photosynthesis**.

EVALUATION OF STUDENT PERFORMANCE

This class requires that students be motivated, on time, and work well in groups. Student participation in labs is essential, and is an important part of the class. Students will be graded on exams, lab write-ups, projects, and class participation. Grades will be assigned *approximately* as follows:

A= 90-100%	D= 55-65%
B= 78-89%	F= less than 55%
C= 65-77%	

Point breakdown (approximate):

Lecture Exams (2)	150 each (300 total)
Final Exam	200
Labs and lab notebooks	80 points
Field trips	10 points each (participation) (Big Creek 20 pts)
Lab Exams (3)	200 total
Group Lab Report/Projects (2)	35 each 70 points total (minus <u>lack</u> of participation points)
Class presentation (Proposal)	30

Learning Outcomes

1. Compare and contrast the major groups of photosynthetic organisms and fungi in terms of evolutionary history, form, function and ecology.
2. Evaluate the ecological role of major groups of photosynthetic organisms and fungi.
3. Examine major ecological principles and analyze biotic and abiotic forces and their impacts.

Withdrawal: If you wish to withdraw from the class, it is your responsibility to do so. If you do not meet the deadline you may receive a grade "F"

Incomplete: If you have not completed all requirements for the class, you may receive a grade of "I". This grade will only be given upon a formal contract/agreement between you and I. FYI: not common!

Attendance: You are expected to attend all class and lab periods. You are responsible for all material presented in the book, in the videos, in lecture and in lab (even if your absence is legitimate). Repeated absence is grounds for you being *dropped* from the class.

EXAMS: If you cannot attend one of the exams, you must notify me **prior** to the exam and provide **proof** of a legitimate excuse. Failure to do so will result in your getting a 0 on the exam – something you do NOT want! LAB EXAMS CANNOT BE MADE UP.

Students needing accommodations should contact the instructor ASAP. As required by the Americans with Disabilities Act (ADA), accommodations are provided to insure equal opportunity for students with verified disabilities. If you need assistance with an accommodation, please contact Disabled Student Services, Room 810, 479-6379, or Learning Skills Program, Room 1073, 479-6220.

Lecture and Lab schedule

Week	Date	Lecture	Lab
1	Mon Feb 6	<ul style="list-style-type: none"> Course Introduction. The changing earth Introduction to cells Principles of Taxonomy and phylogeny Reading: Ch. 25, 26 (Unit 2-Chs. 6-12)	Life Cycles, meiosis and mitosis. <i>Lab manual Chap. 1 and supplemental reading</i>
1	Wed Feb. 8	Cells: <ul style="list-style-type: none"> Basic requirements for life Prokaryotes and Eukaryotes <ul style="list-style-type: none"> Cyanobacteria: photosynthetic prokaryotes Cells and cell membranes/transport Reading: Campbell Chapter 27	Prokaryotes and Eukaryotes I: <ol style="list-style-type: none"> Observations of bacteria and bluegreens Introduction to the Eukaryotic cell <i>Lab manual Chap. 1 and 2</i>
2	Mon Feb. 13	Eukaryotes: <ul style="list-style-type: none"> The Eukaryotic cell – a review Modes of reproduction Plant cells Reading: Campbell Unit 2 (Chs. 6-12) and Chapter 35, pgs 742-745	Eukaryotes II: Plant cells and tissues - types and functions Lab manual Chapter 9, pgs 133-136
2	Wed Feb. 15	Photosynthesis <ul style="list-style-type: none"> Light dependent and light independent reactions Reading: Campbell Chapter 10	Photosynthesis Lab
3	Mon Feb. 20	Presidents Day: Holiday	
3	Wed Feb. 22	Protists I <ul style="list-style-type: none"> Evolution/origin of eukaryotic cells Photosynthetic protists Reading: Campbell Chapter 28	Photosynthetic 'protists' – Plankton! <i>Lab manual chap 3</i>
4	Mon Feb. 27	Protists II <ul style="list-style-type: none"> Algal protists and the origin of land plants Reading: Campbell Chapter 28	Algal protists: algae! <i>Lab manual chap 4 (Algae)</i>
4	Wed Feb. 29	The move to Land: <ul style="list-style-type: none"> Bryophytes (non-vascular plants) Origins of vascular plants Seedless vascular plants (Ferns and friends...) Reading: Campbell Chapter 29	Bryophytes and seedless vascular plants <i>Lab manual chap 6,7</i>
5	Mon March 5	OPEN LAB	LAB EXAM 1 (through Algal protists)
5	Wed March 7	<ul style="list-style-type: none"> Seedless Vascular plants cont. Evolution of seed plants Reproductive adaptations: innovations in a seed The Gymnosperms Reading: Campbell Chapter 30	Ferns and friends <i>Lab manual chap 7</i>

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6	Mon March 12	LECTURE EXAM 1 (through seedless non-vascular)	The Gymnosperms <i>(Lab manual chap 8)</i>
6	Wed March 14	Gymnosperms cont. Flower power: The Angiosperms Reading: Campbell Chapter 38	Intertidal sampling ****11 am -.1
7	Mon March 19	Angiosperms: Co-evolution and the key to success. Angiosperm life cycle Reading: Campbell Chapter 38	Gymnosperms cont. and open lab
7	Wed March 21	Angiosperms: Fruits, seeds, hormones Reading: Campbell Chapter 38, Chapter 39 (39.2)	Flowers and Pollen <i>Lab manual chap 9</i>
8	Mon March 26	LAB EXAM 2 (Seedless nonvascular, seedless vascular, gymnosperms)	Angiosperms: Lily Life cycle <i>Lab manual chap 9</i>
8	Wed March 28	Plant growth and defense Reading: Campbell pp. Chap. 35, 39	Angiosperms: Fruits and seeds <i>Lab manual chapter 9</i>
9	Mon April 2	Plant growth and defense cont. Plant Nutrition and Physiological ecology Reading: Campbell Chap. 37, 39	Angiosperms: Roots and Stems, primary and secondary growth <i>Lab manual chap 9</i>
9	Wed April 4	Plant Nutrition and Physiological ecology Transport: xylem and phloem Reading: Campbell Chap. 36, 37, 39	Plant ecology: Physical factors and leaf morphology <i>Lab manual chap 9</i>
10	<i>SPRING BREAK!</i>	<i>SPRING BREAK! ...☺</i>	<i>Go look at some flowers!</i>
11	Mon April 16	Fungi and Fungal Life cycles Reading: Campbell Chap. 31	Fungi Lab
11	Wed April 18	LECTURE EXAM 2 Gymnosperms, Angiosperms, physiological ecology, xylem and phloem flow	Monterey Mushrooms: Field Trip
	<i>Saturday April 21</i>	<i>Big Creek, Big Sur</i>	<i>Come prepared to hike!</i>
12	Mon April 23	OPEN LAB	LAB EXAM 3 Angiosperms: flowers, life cycle, seeds and fruits, roots, stems and growth, physical factors, fungi
12	Wed April 25	<u>Lecture:</u> Ecology I: concepts and case studies Abiotic/Biotic & Biomes Campbell Chapter 52	Biological data: interpretation, presentation, discussion Big Creek reports
13	Mon April 30	Community Ecology: Factors that structure communities and community succession Reading: Campbell Chap. 54	Big Creek reports

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13	Wed May 2	Community Ecology: Factors that structure communities and community succession Read: Campbell Chap. 54	Big Creek reports
14	Mon May 7	Big Creek Presentations Ecosystems: Energy flow. Trophic structure, biogeochemical cycles, and the special role of plants Reading: Campbell Chap. 55, papers	Big Creek Presentations
14	Wed May 9	Ecosystem function cont. Reading: Campbell Chap. 55	Intertidal analysis ****Low tide 8:00 am - 1.4
15	Mon May 14	Population Ecology Reading: Campbell Chap. 53	Intertidal analysis
15	Wed May 16	LECTURE EXAM 3: (Fungi, Ecology through ecosystems)	Intertidal reports due Plant communities sampling/analysis
16	Mon May 21	Population Ecology Reading: Campbell Chap. 53	Plant communities analysis
16	Wed May 23	Conservation Biology Reading: Campbell Chap. 56	Plant communities reports due
<i>17</i>	<i>Mon May 28</i>	<i>Holiday!!!</i> <i>FINALS WEEK</i>	<i>Almost there!!</i>

****Our Final exam is based on the 11:30 start time of LAB, not lecture:**

<p>Final Exam: Wed May 30,10:00 am-12:50 pm PLEASE NOTE THIS TIME AND DATE!!</p>
