

CABRILLO COLLEGE: Fall 2009
BIOLOGY 1C: Plant Biology and Ecological Principles

Instructor: Nicole Crane

Office #620

ph. 479-5094

e-mail: nicrane@cabrillo.edu

www.cabrillo.edu/~nicrane

Office Hours:

Monday 2:40 pm – 3:40 pm

Wednesday 9:00 am – 9:30 am, 2:40 – 3:45pm

Friday 9:00 am – 9:30 am

Textbooks:

1) 'Biology', Campbell and Reece 8th 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 5th Ed. Van de Graaff, Rushforth, Crawley

Units: 5. Class Format: 3 hrs lecture/ 6 hrs lab per week

Class Hours Lecture: M, W 9:30 – 10:50 room 618

Lab: M,W 11:30 – 2:35 pm room 618

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

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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, move in to community ecology (interactions between living things), and then ecosystems (primarily the non-living components of ecosystems). Then we'll go into behavioral ecology (how interactions with the living and non-living environment affect behavior), and population ecology (what affects populations and population growth). We'll end with an overview of conservation ecology (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 (3)	100 each
Final Exam	200
Labs	5 points each (participation)
Field trips	10 points each (participation) (Big Creek 20 pts)
Lab exams (2)	100 points each
Class Presentation	TBA
Lab projects (2)	35 each

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: I don't do this very often...

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 inform the instructor ASAP. As required by the Americans with Disabilities Act (ADA), accommodations are provided to insure equal opportunity for students with verified disabilities. Veterans may qualify for accommodations. Wounded Warriors may have acquired injuries which through the ADA entitles the use of accommodations. To determine if you qualify or need assistance with an accommodation, please contact Disabled Student Services, Room 810 479-6379, or the Learning Skills Program, Room 1073, 479-6220.

Lecture and Lab schedule

Week	Date	Lecture	Lab
1	Mon Aug 31	<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)	Phylogeny Life Cycles: how the heck do we remember these? <i>Lab manual Chap. 1 and supplemental reading</i>
1	Wed Sept 2	Cells: <ul style="list-style-type: none"> • Basic requirements for life • Prokaryotes and Eukaryotes <ul style="list-style-type: none"> ◦ Cyanobacteria • Cells and cell membranes/transport Reading: 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 Sept 7	HOLIDAY	Woo hoo! Go find some pond scum to check out
2	Wed Sept 9	Photosynthesis <ul style="list-style-type: none"> • Energy and trophic relationships • Light dependent and independent reactions Reading: Chapter 10	Eukaryotes II: Plant cells and tissues - types and functions
3	Mon Sept 14	Eukaryotes: <ul style="list-style-type: none"> • The Eukaryotic cell – a review • Modes of reproduction • Plant cells Reading: Unit 2 (Chs. 6-12)	Photosynthesis lab
3	Wed Sept 16	Protists I <ul style="list-style-type: none"> • Evolution/origin of eukaryotic cells • Photosynthetic protists Reading: Chapter 28	Photosynthetic ‘protists’ – Plankton! <i>Lab manual chap 2 and 3</i>
4	Mon Sept 21	Protists II <ul style="list-style-type: none"> • Algal protists and the origin of land plants Reading: Chap. 28	Algal protists: algae! Lab manual chap 4 (Algae)
4	Wed Sept 23	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: Chapter 29	Open lab/study
5	Mon Sept. 28	EXAM 1	LAB EXAM 1
5	Wed Sept. 30	Bryophytes and seedless vascular Reading: Chapter 29 *Begin Gymnosperms Chapter 30	Bryophytes and seedless vascular plants Lab manual chap 6,7

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Week	Date	Lecture	Lab
6	Mon Oct 5	Evolution of seed plants Reproductive adaptations: innovations in a seed The Gymnosperms Reading: Chapter 30	Ferns and Conifers <i>Lab manual chap 7,8</i>
6	Wed Oct. 7	Flower power: The Angiosperms I Reading: Chapter 38	Flowers and pollen <i>Lab manual chap 9</i>
	Sat 10/10	All Day field trip	Come prepared to hike!
7	Mon Oct. 12	Angiosperms II: Co-evolution and the key to success Reading: Chapter 38	Angiosperms: Lily life cycle <i>Lab manual chap 9</i>
7	Wed Oct 14	Plant growth and defense Reading: Chap. 35, 39	Angiosperms: Fruits and seeds <i>Lab manual chap 9</i>
8	Mon Oct. 19	<ul style="list-style-type: none"> • Plant growth and defense cont. • Plant Nutrition and Physiological ecology Reading: Chap. 37, 39	Angiosperms: Roots and stems, primary and secondary growth <i>Lab manual chap 9</i>
8	Wed Oct. 21	Plant Nutrition and Physiological ecology Reading: Chap. 37, 39	Plant ecology: Physical factors and leaf morphology <i>Lab manual chap 9</i>
9	Mon Oct. 26	Transport: xylem and phloem Read: Chap 36	Transport: xylem and phloem Read: Chap 36 Open Lab study
9	Wed Oct. 28	EXAM 2	LAB EXAM 2
10	Mon Nov. 2	Fungi Reading: Chap. 31 (NOTE: this is lecture)	Fungi (LAB) <i>Lab manual chap 5</i>
10	Wed Nov. 4	Field trip: Monterey Mushrooms **NOTE: am is 'lab' and pm is lecture	Ecology: Concepts and case studies Abiotic and Biotic factors Biomes / aquatic systems Reading: Chapter 52
11	Mon Nov. 9	HOLIDAY	
11	Wed Nov. 11	Ecology Reading: Chapter 52 Biological data: Interpretation, presentation, discussion	Presentations I
12	Mon Nov. 16	Community Ecology: Factors that structure communities and community succession Read: Chapter 54	Presentations II

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Week	Date	Lecture	Lab
12	Wed Nov. 18	Community Ecology: Factors that structure communities and community succession Reading: Chapter 54	Plant communities Data collection
13	Mon Nov. 23	Ecosystems: Energy flow. Trophic structure, biogeochemical cycles, and the special role of plants Reading: Chapter 55, papers	Plant communities (Analysis-Lab)
13	Wed Nov. 25	Ecosystem function cont. Reading: Chapter 55	Plant communities Reports Due
14	Mon Nov. 30	EXAM 3	**Intertidal Lab (Field) Data collection 3:21pm (-.7)
14	Wed Dec. 2	Population Ecology Reading: Chapter 53	Intertidal Analysis
15	Mon Dec. 7	Population Ecology Reading: Chapter 53	Intertidal Reports due
15	Wed Dec. 9	Conservation Biology Reading: Chapter 56	Open Lab

Final Exam: Wed Dec 16 10:00-12:50