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Office Hours: MW: 9:30 - 11:00, Th: 1:00 - 4:00

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## Biology 110 Course Information/Helpful Hints

This course consists of 42 50 minute lecture/discussion periods and 13 three-hour laboratories. Your activities during this course will include: 2 exams, 1 final exam, some sort of worksheet, reflection paper, or write-up for each lab and either an oral presentation OR a service-learning activity. I will explain the nature of the tests, labs, and **final presentation or service learning as well as the course objectives, grading policy** and treatment of class absences in this introduction. These and other topics will also, of course, be further elaborated upon/re-explained during the course whenever such explanation becomes relevant. You will be earning separate grades in this course: one for your performance in the lab and the other from the lecture portion of the course.

### Attendance:

My policy on missing classes is this: You can miss a few (--2) lectures and *perhaps* if you're great at understanding *someone else's* notes *and* you have a *natural knack for understanding science* *and* you have kept up with *all of* the reading, then, perhaps, missing those few classes won't hurt your grade or the greater benefits you will reap from the course.... Its your call; its your grade, your benefit, your life....

Missing a lot *of* classes (>2) is, in my opinion, not a good idea (no matter how sleep-deprived, behind in another class, etc. you are!). It means you, your family or Chaminade has wasted \$ in paying me to teach a you who isn't there. It means you'll know a little less when you graduate. It means I get to know you a little less. It means you're likely to do less well on the next exam than you probably would have done had you come to class! **BESIDES** education **IS** (in addition to expensive) empowering, liberating, interesting, enriching, entertaining, enjoyable, etc. So, come to class. Don't let those other stresses take you from our ranks. Budget that time. Prioritize wisely!

While missing lectures will not technically effect your grade, missing labs *will*. *If* you are sick, experiencing some genuinely stressful situation (death in the family, abuse, pregnancy, etc.) let me know and we'll see what we can do about it. If you bring me evidence of your illness - in the form *of* some document signed by your doctor -- then your lab absence is excused. Otherwise it is unexcused. Unexcused lab absences result in you receiving a zero (F) for that lab.

Athletes -- if you have to miss for a game or travel let me know prior to your absence.

### Grading:

I am NOT the world's toughest grader, BUT, I do expect you to rise to the challenge of this course -- and enjoy yourself doing so. By this I mean that there will be a lot of material; biology is a huge field, and this course deals **with subject matter, which I am sure you are aware, that is** the subject of much concern and debate today. My aim is not to make the material "easy". My job is to make the material *interesting* (which it is already), *understandable* (which it is if I do a good job) and *integrated* with your already- existing knowledge. I *will not* diminish the complexity of the subject-matter presented in this course; I will try to make that complexity easily graspable. I reward you for your efforts to **learn** this complex, voluminous and illuminating stuff by not being a "bear" when it comes to grading. In other words, your efforts will be rewarded. But, like a bear sleeping by the side of the river full of salmon -- little effort will reap little reward. So -- lets go fishing for knowledge! (I provide the "pole" its up to you to "hook some insight".)

### Classroom Protocol:

Please ask questions **AT ANY TIME DURING LECTURE** (or anytime I am in my office/available to you). **You do not have to raise your hand in class to ask a question** or make a comment as I may be writing on the board at the time your question comes to mind, so just "holler" out. I prefer the class to feel like a seminar in which you may ask any relevant question or make a comment at any time during lecture/lab. We all **learn** from each others thoughts and experiences. A question not asked and a comment not shared are, in my opinion, minor tragedies. Enlighten each other. Think. Share.

The only dumb question is the one in which you ask yourself if you should ask your question!!!

### Pace of the Class:

This class will proceed at a fairly rapid pace. Please come prepared to absorb the material like a poriferan (sponge). Do the reading for class prior to class. I might decide to give a few "pop" quizzes on the readings. Ug. I detest pop quizzes because I do not like to micro-manage my students: you guys are adults right!? But, *if*

I perceive that the reading isn't getting done (which means we all suffer since you won't be able to contribute your relevant pearls-of-wisdom to the discussions) I'll "inspire" you to read via the of "pop" quiz method....

#### Subject of the Course:

This course is divided into three sections. In the first two sections we will be examining mans' connections to nature from a scientific perspective. We will be learning how we depend on and interact with nature in part I and we will be **learning** how we *are* nature and how we got here in part II. Again both of these sections consider "man and nature" from a scientific perspective. In part III of this course we will be examining mans' perception of himself and his importance in the universe/nature. We will be attempting to understand how that perception determines how man treats nature and natural things. As you are probably aware, all the peoples of the world do not treat their environment the same.

Much of what we'll talk about in this course involves issues about which all kinds of decisions are being made/need to be made. I want you all to recognize **when you have what it takes to make an informed decision** or statement about an environmental issue. You need to be intellectual and free from the helplessness of the scientifically illiterate when it comes to answering inherently scientific questions. For example: In your opinion, is global warming a threat?... **DON'T ANSWER YET!!!** Unless you've already read the literature or have done your own research you had better not venture an answer! There is no real power in a nonscientific argument about a phenomena that only science can document.

Throughout the course we'll consider and attempt to devise ourselves some potential solutions to many of the problems we've created. The solutions we'll consider will come out of the particular perspective from which we are viewing the problem at that point in the course. For example, when we are discussing species loss due to habitat depletion in the initial scientific section of the course, we will consider scientific solutions to the problem, while when we discuss why we have allowed ourselves to hunt a species to extinction in the final section of the course, we will discuss what it is about us -- about our environmental ethic -- that has allowed us to do such a thing and how we **might** remedy the problem by fixing the ethic (rather than devising some scientific solution).

#### Objectives of the Course:

1. To understand man's relationship to nature from a scientific perspective. (A scientist might say this is how we *really* fit in!)
2. To understand what an ecosystem is.
3. To understand how ecosystems generally work.
4. To understand how we have effected ecosystems.
5. To understand how we are not at all separate from nature in terms of our physical dependence on it and in terms of our origin from a scientific perspective.
6. To investigate the similarities and differences in our scientific and spiritual understanding of our place in nature.
7. **TO introduce the concept of environmental ethic.**
8. To examine some distinct environmental ethics.
9. To attempt to understand the reasons why a people have a particular environmental ethic (including our own environmental ethic).
10. To understand how our ethic has resulted in our treating nature as we do.
11. To **determine** whether our current view of our place is in need of change due to our effect on nature, and if so, why (and if not, why not).

#### Helpful Hints:

1. Buy a pen with more than one color ink or bring a number of different colored pens. You'll need these to help you distinguish what's what on your drawings.
2. Study with a **friend**. Biology is a science. Pieces of information fit together to create one (fairly) logical **reality**. **Studying out** loud with a friend can help **you** realize what does and does not make logical sense to you. If it doesn't make sense then you are probably misunderstanding something and should see me so **that I** can help de-mystify whatever it is that is confusing you.
3. Take thorough notes. Write down whatever you can. If it gets written on the board it should get written in your notes. During discussions I may write less on the board, but keep in mind that material we discuss may be covered in exams too so you should jot down some notes that will enable you to remember the main points of the discussion at a later date.
4. Memorize those new scientific "jargon" words. They may seem cumbersome at **first** but they have specific meanings and are very useful.
5. Keep up with the reading. This course builds on itself, if you keep up with the reading all should fall into place as we proceed.

6. Take the labs seriously. Make sure you listen for the important details regarding a lab so that you'll know: Do I need to bring water? Will Dr. Gail provide drinks? Can I wear high heels on the hike? What do I need to come prepared with for lab? Many-a-student has been dehydrated, empty-handed, sun-burned etc.! Hound me: make sure to ask "What do we need?!" I sometimes don't say it enough or loud enough. I don't mind being asked again and again if it will enhance your experience to know the answer! Many of our labs are going to be very enjoyable. Don't forget however that I want you to **learn something** from each of them (And for those of you that need a little incentive: a portion of your lab grade is subjective...)

Exams: Exams will be given during the lecture period. If you miss the exam you will receive a zero for it unless your absence is excused. If your absence is excused then an alternative time for you to take the exam will be **arranged**. **No** test scores **will be dropped**. **Tests will be graded on a curve**. **Exams will contain a variety** of types of questions including: multiple choice, true or false, matching, fill-in, short answer, essays and diagramming. Each exam will be preceded by a review sheet.

Grades: The lecture portion of the course is worth 3.00 credits. The lecture grade will be broken down as follows:

Exam I	25%
Exam II	25%
Final Exam	30%
Oral Presentation/Service Learning	20%

The laboratory portion of the course is worth 1.00 credit. The Lab grade will be broken down as follows:

Lab Worksheets, Essays, etc.	94
Instructors subjective opinion of your effort	10%

#### Service Learning Option

Service learning means that you (1) **learn** environmental biology (2) in our community, all the while (3) doing some good for man or man and nature. Pretty neat idea huh? Actually its a practical, intelligent, useful, lasting way for you to **learn**. The emphasis is on learning material relevant to this course, the twists are that you do it in the real world and that you can feel good (because you are doing something good for the community) about it.

No one ever asked me what kind of *meaningful* career I planned on doing, they simply asked what sort of career was I pursuing. While the vast majority of careers do provide something good to man and/or man and nature the consideration of the *sort of good* or of the *particular kind of meaningfulness* I wished to have as part of my career was never addressed! As I look back on this I find it a great irony since I derive most of the pleasure from my current career because I believe (hope, imagine) that I am doing some GOOD, i.e. doing something meaningful, in teaching, mentoring, knowing you.

I will explain the logistics of service learning to you in a separate handout. Basically you will be **volunteering** 20 hours at a particular agency where you **learn** and do some kind of environmental work for the good of the community.

Your task now is to decide:

A. Do you want to do service **learning** instead of the Final Project?

If you answer yes to this question let me know ASAP.

The Only Thing that is Constant is Change Clause: The instructor, despite her best efforts to anticipate the *best* course for the course and stay on that course, reserves the right to tinker with, change, deviate from, or omit an aspect of the syllabus at any time. Biology is a four-dimensional process and so is this course: both "unfold" in time. I will notify you of any mutations as soon as I become aware of them.

## Man & Nature Course Readings

All of the assigned readings in this course are taken from the following books. Ask to see any of these books at any time if you are interested in them.

Birke, L. & R. Hubbard eds. Reinventing Biology: Respect for life and the Creation of Knowledge. Indiana University Press, Bloomington & Indianapolis. 1995.

Brown, L., N. Lenssen & H. Kane. Vital Signs: The trends that are Shaping Our Future. W.W. Norton & Co., New York, NY. 1998.

Callicott, J. B. Earth's Insights. University of California Press, Berkeley, CA. 1994.

Carson, R. Silent Spring. Houghton Mifflin Co., Boston, MA. 1962.

Futuyma, D.J. Evolutionary Biology. Sinauer Associates, Inc. Sunderland, MA. 1986.

Glendinning, C. My Name is Chellis and I'm in Recovery from Western Civilization. Shambhala, Boston MA. 1994.

Gould, S.J. Ever Since Darwin: Reflections in Natural History. W.W. Norton & Co., New York. 1973.

Hartmann, T. The Last Hours of Ancient Sunlight. Mythical Books, Northfield, VT. 1998.

Haught, J. F. Science & Religion: From Conflict to Conversation. Paulist Press, New York, NY. 1995.

Heinberg, R. A New Covenant with Nature. Quest Books, Madras, India. 1996.

Lewontin, R.C., S. Rose & L.J. Kamin. Not in Our Genes: Biology, Ideology and Human Nature. Pantheon Books. New York, NY. 1984.

McLuhan, T.C. The Way of the Earth: Encounters with Nature in Ancient and Contemporary Thought. Simon & Schuster, New York. 1994.

Miller, G.T. Jr. Environmental Science: Working with the Earth. 5th Edition. Wadsworth Publishing Co., Belmont, CA. 1995.

Newton, L. H. & C. K. Dillingham. Watersheds: Classic cases in Environmental Ethics. Wadsworth Publishing Co., Belmont, CA. 1994.

Norton, B.G. Why Preserve Natural Variety? Princeton University Press, Princeton, NJ. 1987.

Quammen, D. Natural Acts: A Sidelong View of Science and Nature. Avon Books, New York, N.Y. 1982.

Quine, W.V. & J. S. Ullian. The Web of Belief. Random House, New York. 1970.

Raup, D. M. The Nemesis Affair: A Story of the Death of Dinosaurs and the Ways of Science. W. W. Norton and Co., New York, NY. 1986.

Shiva, V. & I. Moser eds. Biopolitics. Zed Books Ltd., London, England. 1995.

Thomas, L. The Lives of a Cell. Bantam Books, New York. 1974.

Wilson, E.O. ed. Biodiversity. National Academy Press, Washington D.C. 1988.

Wilson, E.O. The Diversity of Life. W.W. Norton and Co., New York, NY. 1992.

Biology 110: **People and Nature**  
Our physical (physiological), historical and spiritual  
connections to nature and the roles these connections play  
in determining our treatment of nature.

*Say you want to convince your father-in-law to get involved in conservation -- in  
rescuing biodiversity. How would you start?... would you appeal to his intelligence  
or his emotions?*

Michael Soule

*Heaven is my father and earth is my mother and even such a small creature as I  
finds an intimate place in its midst.*

Chang Tsai

*We can't succeed in teaching people biophilia (i.e. , the love of life), with economic  
arguments and ecological reasoning alone. We must see to it that they have limbic  
experiences, not just neocortical ones. We must learn from the experts -- politicians,  
advertising consultants who have mastered the art of motivation. They will tell us  
that facts are often irrelevant. Statistics about extinction rates compute, but they  
don't convert.*

Michael Soule

*Is not Ae sky a father and the earth a mother, and are not all living things with feet  
or wings or roots their children?*

Black Elk

*Returning to the father-in-law, who is still waiting to be convinced of the importance  
of biodiversity, we come face to face with the urgency of communications. What is  
the message that we want to get across? A Buddhist sutra teaches, "Each thing has  
its own intrinsic value, and is related to everything else ion function and position. "  
Ecology affirms it. But what then? How do we convince others? Maybe it begins  
with the courage to let ourselves describe our private emotional experience of nature  
to our father-in-law.*

Michael Soule

**Our Physical (Physiological) Connections to Nature**

- 1/11 Course introduction; Visit from Nat Pak, Nature Conservancy's volunteer coordinator
- 1/11 LAB 1: Video "Biodiversity"
- 1/13 Our intuitive connection to nature; Introduction to nature: living vs. non-living  
Read: Chapter 3: Miller
- 1/15 The **variety** of life: Taxonomy & biodiversity  
Read: Chapter 4: Miller
- 1/18 Biodiversity; Ecological nutritional roles
- 1/18 LAB 2: Examination of a Real Ecosystem /Algae Collection and Species Identification:  
Diamond Head (worksheet due 1/25 )
- 1/20 Ecological niches; Interactions between organisms: Competition & predation  
Read: Chapter 5: Miller
- 1/22 11:00 am **CLASSES CANCELLED TODAY**

- 1/25 Interactions between organisms: Symbiosis, coevolution and mimicry;  
 1/25 LAB 3: Ecological Interactions: **Waikiki** Aquarium (group pursuit worksheet due 2/1)  
 1/27 Productivity & trophic pyramids  
 1/29 The importance of sunlight; Where life **occurs**: Habitat types  
 Read: **"We're made out of sunlight"** T. **Hartman (on reserve)**
- 2/1 Nutrient cycles  
 2/1 LAB 4: Diversity and Taxonomy Lab: The five kingdoms of life and the major animal phyla (worksheet due 2/8)  
 2/3 Ecosystems through time: succession  
 Read: "The Creation of Ecosystems" E.O. Wilson (on reserve)  
 2/5 Summarizing the many ways man is part of nature from a scientific perspective
- 2/8 **EXAM I**  
 2/8 LAB 5: Pollution Experiment: Bring a "pollutant" to lab! (formal lab write-up is due on 4/26)  
 2/10 Biological abundance measures; The human population  
 Read: **Chapter 6! Miller**  
 2/12 Man's effect on nature: Human population and habitat depletion
- 2/15 **NO CLASSES**  
 2/15 **N O LAB**  
 2/17 Man's effect on nature: Air pollution & acid rain  
 Read: Chapter 9: Miller  
 2/19 Video: "Race to Save the Planet: Only One Atmosphere"
- 2/22 Man's effect on nature: Global **warming** and ozone depletion  
 Read: Chapter 10: Miller  
 2/22 LAB 6: Life Expectancy Lab using Data Collected from Hawaiian Cemeteries (data worksheet and analyzed data due 3/1)  
 2/24 **Man's effect** on nature: Water depletion  
 Read: Chapter 11: Miller  
 2/26 Man's effect on **nature**: Water pollution
- 3/1 Man's effect on nature: Soil and Minerals  
 Read: Chapter 12: Miller  
 3/1 LAB 7: Sand Island Waste Treatment Plant (worksheet due 3/8)  
 3/3 Man's effect on nature: Wastes  
 Read: Chapter 13: Miller  
 3/5 Species loss due to mans' interactions with nature  
 Read: Chapter 17: Miller  
 Homework: Save ALL of your trash on either Saturday (3/6) or Sunday (3/7) and bring to lab on Monday (3/8).
- 3/8 **EXAM I I**  
 3/8 LAB 8: Trashanalysis Lab: Bring in your trash! (worksheet due 3/15)

### **Our Historical Connection to Nature**

- 3/10 Organisms and lineages through time; The creation and loss of lineages (discussion)  
 Read: "Dinosaurs and the Death of Species": E. O. Wilson (on reserve)  
 3/12 Evolutionary mechanisms: The role of DNA
- 3/15 Evolutionary mechanisms: Natural selection  
 Read: "Ecology: The Environmental Context of Evolutionary Change": D. J. Futuyma (on reserve)  
 3/15 LAB 9: Living Resources: Dolphin-Safe Tuna and the Global Fisheries: (lab handout due on 3/29)  
 3/17 The origin and evolution of man and its sociological implications  
 Read: "Darwin and the Spin Doctors": S. J. Gould (on reserve)

- 3/19 The role of man and evolution in creating/eliminating biodiversity (discussion)  
**Spiritual and Cultural Views of Our Place in Nature**
- 3/29 The modern history of man and its role in determining environmental ethics  
 Read: Chapter 2: Miller  
 /29 LAB 10: Koyanishqatsi (worksheet due 4/5)
- 3/31 Western mans' present perceived place (lecture and discussion)  
 Read: "Fateful Choices, Then and Now" R. Heinberg (on reserve in the library)
- 4/2 **N4 CLASSES**
- 4/5 Nature as an equal (or greater): Earth-centered worldviews; Nature as a lesser: Man-centered worldviews  
 Read: "Anthropocentrism": B. Norton (on reserve)
- 4/5 LAB 11: The Value of Nature from a Western Worldview: Field trip to the Humane Society (questionnaire due 4/12)
- 4/7 When differing environmental ethics meet  
 Read: "Chico Mendes and the Amazonian Rain Forest": by L.H. Newton & C. K. Dillingham (on reserve)
- 4/9 Some Earth-centered cultures  
 Read: & "Far Western Environmental Ethics": J. B. Callicott (on reserve)
- 4/12 Video: "Nomads of the Rainforest"
- 4/12 LAB 12: Value Lab; Bring two "things" to class for us to determine the value of. (Dr. Gail will explain this further.)(write-up due 4/19)
- 4/14 Worldviews and habitat degradation  
 Read: "The Loss of Diversity": P. R. Ehrlich, OR "The Tragedy of the Commons": G. Hardin (both on reserve)
- 4/16 Western methods of ameliorating the relationship between man and nature  
 Read: "Unmined Riches": E.O. Wilson (on reserve)
- 4/19 Nature and Economic Valuation  
 Read: "Why put a Value on Biodiversity?": D. Ehrenfeld (on reserve)
- 4/19 LAB 13: Guest Speakers with Solutions
- 4/21 Solutions: Environmental Economics  
 Read: Chapter 7: Miller
- 4/23 Solutions: Environmental Economics
- 4/26 Solutions at the level of the individual (discussion)  
 Read: "The Other Road" Rachel Carson (on reserve)
- 4/26 Final Presentations Presented/Service Learning Reflection due/Pollution Lab due!
- 4/28 The environmental ethic (discussion)  
 Read: "The Environmental Ethic": E. O. Wilson (on reserve)
- 4/30 Our solutions  
 Come prepared to explain: (1) What you think is the biggest environmental challenge we now face, and (2) What you think the solution(s) will be/is.

#### Key to the Syllabus:

Dates in bold lettering are labs.

Dates that are underlined are important to you because there is an exam or something to bring to class on that date.

FINAL EXAM: Our final exam is Weds, May 5, from 10:30 to 12:30 pm in **HH17**.

## *Introductory Biology Questionnaire*

Everyone--

I am asking you to answer these questions so that I may learn (1) why each of you is taking this course, (2) what kind of biology background you have, and (3) what you would like to take from the course - what are you interested in learning and why.

Please answer each of the following in the **space provided.**

1. Why are you taking this course?
2. How much biology/health science have you had in school (junior high, high school, college, other vocational school) prior to now?
3. What do you hope to **learn** in this course?

So that I may learn something from you, please **complete** the following

1. In my **opinion** good teachers/instructors.... (what's something that, in your opinion, good instructors do that makes them effective)
2. I really dislike it when teachers/instructors.... (what's something that, in your opinion, makes an instructor ineffective)

Finally, just a few specific biology questions so that I can see what you've been taught already:

1. What is DNA?
2. What is ecology?
3. What is a keystone species?
4. Circle the two most closely related organisms:

squid

seastar

monkey

cockroach

lobster

jellyfish