

Biology 110 – Life Science for Educators
University of San Diego, Biology Department
Spring 2011

Lecture: Mondays and Wednesdays 11:15 AM – 12:10 AM (Shiley Technology 232)

Lab: Mondays 2:30PM – 5:30 PM (Shiley Technology 225)

Instructor: Marcelle Darby

Office: Shiley Technology 433

Office Hours: T & Th 11 am – 12:00 pm and 1 – 2 pm (I also welcome appointments)

Telephone: ext. 4074,

E-mail: mdarby@sandiego.edu for now, but please use Blackboard when it is ready (I'll let you know)

Required Materials:

- **Textbook:** *Campbell Essential Biology with Physiology*, 3rd Edition by Simon, Reece, and Dickey
- **Lab Manual:** *Laboratory Manual for Biology 110*, custom published by McGraw Hill
 - You will be able to purchase this at the bookstore before lab starts at the end of March
- *Easy Steps to Writing Fantastic Research Reports* by Dreher, Davis, Waynant, and Clewell
 - You will be able purchase this later from the Biology Department
- K-12 Standards for Science (I will provide a link to this rather lengthy document on Blackboard)
- Life Science Standards for Multiple Subject Teaching Credential (I will post this on Blackboard)

Course Description

Life Science for Educators is a one-semester course in the general concepts of biology tailored for the liberal studies major. The course is designed to meet the subject matter requirement in life science for the Multiple Subject Teaching Credential. Topics covered include the scientific method, biochemical molecules, cell structure and function, anatomy and physiology of animals and plants, genetics, evolution, and ecology. Field trips and laboratory sessions provide experience with selected biological principles and practices. Prerequisite: CHEM/PHYS 105. Two hours of lecture and one laboratory weekly.

Goal Statement (from Natural Sciences “Core” category)

Students should be able to:

1. understand basic concepts of the natural sciences;
2. appreciate the process by which knowledge in the natural sciences is advanced;
3. distinguish between sound science and unsound science;
4. use rigorous reasoning and the scientific method to test hypotheses;
5. show familiarity with tools, techniques, and instrumentation used in the natural sciences;

Student Learning Outcomes for Biology 110 that Conform to the Goal

1. Demonstrate the safe and proper use of tools, techniques, and instrumentation used in the laboratory and field. (Goal 5)
2. Formulate, test, and evaluate hypotheses, and communicate results in written and oral presentations. (Goals 1, 2, 3, 4 & 5)
3. Explain the relationships between form and function at various levels of biological organization. (Goals 1 & 5)
4. Summarize the metabolic processes of cellular respiration and photosynthesis and relate them to energy flow and nutrient cycling through ecosystems. (Goals 1 & 5)
5. Describe the roles of cellular reproduction in the growth, development, reproduction, and life cycles. (Goals 1 & 5)
6. Describe basic patterns of inheritance and the flow of genetic information. (Goals 1, 2, 3 & 5)
7. Relate the principles of genetics and evolution to the unity and diversity of life. (Goals 1, 2, 3, 4 & 6)
8. Provide examples of how human activities modify the structure and functioning of ecosystems. (Goals 1, 2, 3, 4 & 5)
9. Apply knowledge and skills in planning and presenting biology lessons. (Goals 1, 3 & 5)

Graded Materials

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|--|-----|
| • ODI Volunteer Instructor (Unit 1: Ecology and Diversity) | 100 |
| • 1 st Midterm Exam (Unit 2: Cell Biology and Physiology) | 100 |
| • 2 nd Midterm Exam (Unit 3: Genetics and Evolution) | 100 |
| • Quizzes and in class assignments | 75 |
| • Laboratory (7 @ 20 points each) | 140 |
| • Team Research Project | 60 |
| • Attendance/Contribution | 25 |

Total 600

Grading Scale

| | |
|-----------|---|
| 90-100% | A |
| 80-89% | B |
| 70-79% | C |
| 60-69% | D |
| Below 60% | F |

Because the grade "C" designates competency in the subject matter, this grade will be reserved for students who have demonstrated that they have mastered the content.

Academic Integrity

I expect you to strictly observe USD rules regarding academic honesty which include:

- abstaining from cheating on exams and quizzes
- properly referencing published written and electronic material
- submitting work that is your own (You will find useful information regarding plagiarism on Blackboard. If you have any questions regarding what behavior is proper, including what constitutes plagiarism, please ask me or a reference librarian.)

Attendance and Class Contribution

You can easily earn all of the attendance and contribution credits by attending and actively participating in all lectures, laboratories, and Ocean Discovery Institute volunteer instructor activities. Your active involvement is the basis of this course. Behaviors that count as positive contributions include:

- showing up
- answering questions
- asking questions about material being presented in class or material in the text
- making comments that might include relating a personal experience, sharing relevant content from another class, or responding to comments from other students
- contributing within small groups toward the successful completion of class activities

Faithful attendance and contribution will likely benefit your grade for all other aspects of the course (exams, quizzes, and in class assignments). Here are a couple of dates you will want to commit to memory: **March 30, May 4, and May 13**. Let your folks know too, before they purchase those plane tickets. Together they (2 exams and the research presentation) constitute 160 points, or a bit over 40% of your grade. Now I realize that life has a way of getting in the way. Let me know, as early as possible and preferably in person, if you have to miss lecture, lab, or a volunteer session. Also, for any course responsibility you miss, it is up to you to request handouts and assignments from me during office hours or download them from Blackboard when available.

Interested in increasing your chances of doing well in biology?

- Start your studying today, and study every day until May 13. This will give you the time you need to learn this stuff.
- Attend all lectures and labs.
- **Be Prepared:** Read the text chapter before coming to lecture, and the lab manual (and relevant textbook pages) before lab.
- Take extensive notes during lectures and pre-lab lectures.
- Review your lecture notes, rewrite them, and see me if you have gaps.
- Answer the chapter questions and check your understanding of key concepts.
- Form a study group.
- Ask questions in class.
- Frequent my office hours to work on concepts for which you need clarification.
- Help create a collaborative learning environment.
- The California Subject Exam for Teachers (CSET) will be required for all candidates for elementary school teaching (Yes that means you.). This course is aligned to the Content Specifications for Domain 2: Life Science. I highly recommended that you **keep your books, lecture/lab notes, syllabus, and other materials** from this course for study purposes. They may also serve as valuable reference materials later, when you actually get to teach life science to your own class.



Life Science for Educators, Spring 2011 Tentative Lecture Topic Schedule*

| Date | Topic | Text Chapter |
|------------|---|--|
| January 24 | Beginning Matters Fundamental Properties of Life | 1 |
| 26 | Hierarchy of Life Scientific Method | 1 |
| 31 | No Class- Film: <i>World's Major Biomes</i> | 18 (380-393) |
| February 2 | Scientific Method Taxonomy | 1 14 (285-286) |
| 7 | Diversity of Life Adaptations | 17 18 |
| 9 | Ecology Overview: Ecosystem Structure & Function Film: <i>On the Edge of Land and Sea</i> | 18 |
| 14 | Community Ecology and Ecosystem Ecology Ecosystem Function: Energy Flow & Nutrient Cycling | 20 20 |
| 16 | Conservation Unifying Concepts of Animal Structure & Function | 19 (412-421) & 20 21 |
| 21 | Life's Important Inorganic Molecules Water | 18 2 |
| 23 | Molecules of Life | 3 |
| 28 | Molecules of Life | 3 |
| March 2 | Cell Components: Structure & Function | 4 |
| 7 | Energy Concepts & Cellular Work | 5 |
| 9 | Enzymes & Membrane Function Spring Break March 14-18 | 5 |

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|-------|----|---|--------------------------------------|
| | 21 | Cellular Respiration Overview | 5 |
| | 23 | Photosynthesis Overview | 6 |
| | 28 | Review | 8 |
| | 30 | <i>Exam Unit 2</i> | <i>(Ch. 2, 3, 4, 5, 6)</i> |
| April | 4 | Cellular Reproduction: Cell Cycle Mitosis | 8 |
| | 6 | Comparing Meiosis & Mitosis Origins of Variation | 8 8 |
| | 11 | Genes & Inheritance | 9 |
| | 13 | Genes & Inheritance | 9 |
| | 18 | DNA Structure & Function | 10 |
| | 20 | Evolution: Evidence | 11 |
| | | Easter Break April 21-25 | |
| | 27 | Evolution: Natural Selection | 11 |
| May | 2 | Phylogenetic Classification Review | 14 |
| | 4 | <i>Exam Unit 3</i> | <i>(Ch. 8, 9, 10, 11, 14)</i> |
| | 9 | Work on Team Research Projects | |
| | 13 | Poster Presentations for Team Research Projects 11:00AM – 1:00 PM (ST 232) Written Reports Due | |

* This schedule is subject to change. Any changes will be announced during lecture.