



BIOL C1000 - Introduction to Biology with Lab

Catalog Description

Transfer Status: CSU/UC

Unit(s): 4.00

Lecture: 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Total: 102.00 Contact hours/102.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: This combined lecture and laboratory course provides the non-biology major with an introduction to living things and their environment. Students use experimentation and investigation to develop important critical thinking skills. Students learn about the process of science, the building blocks of life, the role and regulation of DNA, how populations change over time, the movement of energy within and between life forms, and how species interact with each other and their surroundings. By the end of the course, students will be able to apply an understanding of biological concepts to current issues and their impacts on society.

Objectives

Upon successful completion of this course, the student should be able to:

1. Apply the scientific method, including recognizing the elements of experimental design, gathering and analyzing data, and interpreting results.
2. Demonstrate scientific literacy by evaluating social, ethical, and equity issues connected to biological sciences.
3. Describe how living things are made of smaller structures that work together to enable the organism to survive.
4. Compare how living things depend on each other and the physical environment as they interact to obtain, change, and exchange matter and energy.
5. Explain how the diversity of living things is the result of evolution of organisms through mechanisms such as heredity, random change, and natural selection.
6. Collaborate on laboratory investigations of the biological content using appropriate, safe methods and equipment.

Course Content

Topic Titles / Suggested Time Topic	
	<u>Lecture</u>
<u>Topics</u>	<u>Lec Hrs</u>
1. The scientific method and the process of science	51.00
2. Cellular chemistry and biochemistry	
a. Atoms and bonding	
b. Properties of water	
c. Structure and function of biological molecules	
3. Cell structure and function	
a. Cells, membranes, and organelles	
b. Prokaryotes versus eukaryotes	
c. Transport across the cell membrane	
4. Cellular metabolism	
a. Enzyme structure and function	
b. Photosynthesis	
c. Cellular respiration	
d. Fermentation	
5. Cellular division	
a. Prokaryotic binary fission	
b. Eukaryotic cell cycle	

Topics**Lec Hrs**

- c. Eukaryotic asexual reproduction (mitosis)
- d. Eukaryotic sexual reproduction (meiosis)

6. DNA structure and function

- a. DNA replication
- b. Transcription and translation
- c. Regulation of gene expression
- d. The impact of mutations
- e. The impact of biotechnology

7. Principles of heredity

- a. Mendelian genetics
- b. Non-Mendelian genetics
- c. Application to human genetics

8. Principles of evolution

- a. Evolutionary mechanisms
- b. Evolutionary evidence
- c. Speciation and classification
- d. The effect of extinction
- e. Survey of biodiversity across Domains

9. Principles of ecology

- a. Biosphere and biomes
- b. Population growth and regulation
- c. Community interactions
- d. Flow of energy and matter in ecosystem
- e. Human interactions with the biosphere
- f. Conservation biology and sustainability

Total Hours: 51.00**Lab****Topics****Lab Hrs**

- 1. Process of science and experimental design
- 2. Personal protective equipment, care and safe use of laboratory equipment
- 3. Utilization of microscopy to visualize and identify cell structures
- 4. Cellular transport mechanisms
- 5. Energy cycling and metabolism
- 6. Cell division
- 7. Genetics and inheritance
- 8. Diversity of life
- 9. Evolution
- 10. Ecology

Total Hours: 51.00**Methods of Instruction**

- A. Class Activities
- B. Field Trips

- C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- D. Laboratory Experiments
- E. Lecture
- F. Reading Assignments

Methods of Evaluation

- A. Examples of evaluation methods used to observe or measure students' achievement of course outcomes and objectives may include but are not limited to quizzes, exams, laboratory work, field journals, projects, research demonstrations, etc.

Methods of evaluation are at the discretion of local faculty.

Examples of Assignments

Reading Assignments

1. Read the textbook sections on prokaryotic and eukaryotic cells and then construct a Venn diagram that compares and contrasts bacterial cells, plant cells, and animal cells. Be prepared to discuss in class.
2. Read the textbook section on the biogeochemical cycle of carbon and then construct a diagram that demonstrates the path of carbon through ecosystems. Include at least 3 human activities that impact the carbon cycle.

Writing Assignments

1. In lab this week you calculated your ecological footprint and compared it to the average ecological footprint in several different countries around the world. Watch a few videos on our Resource page in Canvas on climate justice. Write a 1-2 page personal reflection discussing the contributions to your ecological footprint that you can change, and those that you can't change. In your written reflection, include at least three changes that could be made at the individual, campus, or community level that would lower your ecological footprint. Include an explanation of climate justice in your written reflection. Who is contributing the most to climate change, and who is being disproportionately harmed?
2. Write a 1-2 page description of a current ethical issue in biotechnology. It could be one we've discussed in class (GMOs, gene therapies, vaccines) or one you pick on your own. Describe the pros and cons of this technology and whether you support its use or do not support its use. Be sure to include who may be harmed by using or not using the technology, what the current use of the technology is, and what the future implications of its use could be.

Out-of-Class Assignments

1. Go to the HHMI Virus Explorer and click on "Launch Interactive". Click on a few different viruses to explore the types of information included in this resource. Take notes as you explore these viruses to answer the following questions that we will discuss in class next week: a. What do you notice about these viruses? b. What do you wonder about viruses as you explore this site? c. Choose two viruses to further investigate. What two viruses did you choose to further investigate? Why did you select these viruses? What characteristics do your two viruses have in common? How are they different? d. Look at the labeled structures of each of your viruses. What type of biological molecule is each structure an example of? e. Compare and contrast these viruses with cells. What characteristics do these viruses share with cells? How are these viruses different from cells?
2. The ancestors of land plants lived in water. What challenges did plants face as they moved onto land? What structures allowed plants to overcome these challenges? You can turn in your answer in the form of three written paragraphs, a song, poem, table, audio recording, animation, sketch, or video. Include at least three challenges to living on land, and the structures that allow land plants to overcome each of those challenges.

Recommended Materials of Instruction

Simon, E., Dickey, J., & Reece J. (2019). Campbell Essential Biology. *Pearson*, 7th. 9780134765037.

Hoefnagels, M. (2025). Biology: The Essentials. *McGraw Hill*, 4th. 9781264388950.

Bres, M., & Weisshaar, A. (2019). Thinking About Biology: An Introductory Lab Manual (What's New in Biology). *Pearson*, 6th. 9780134765624.

Zero Cost Textbook

Fowler, S., Wise, J., & Roush, R. (2025). Concepts of Biology. (OER). <https://openstax.org/books/concepts-biology/pages/1-introduction>

Melody Schmid. Biology 1 Lab Guides. Butte Campus Publishing.

<https://sites.google.com/view/biol1-lab-guides/home>

Melody Schmid. Biology 1 Lab Manual. (2025). Butte Campus Publishing. 3rd. 9798331638429

Other Learning Materials

Texts used by individual institutions and even individual sections will vary.

Minimum Qualifications

Biological Sciences (Masters Required)

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