

BIOLOGY 270L
INTRODUCTION TO ENVIRONMENTAL BIOLOGY LABORATORY

BULLETIN INFORMATION

BIOL 270L: Introduction to Environmental Biology Laboratory (1 credit hour)

Course Description:

Demonstrations, data analyses, discussions, and films relating to human ecology, resource use, and environmental impact. Not for major credit

Co-requisite: Prereq or coreq: BIOL 270

Prerequisites: Prereq or coreq: BIOL 270

Note: Two hours per week.

SAMPLE COURSE OVERVIEW

BIOL 270L is an introductory-level biology lab course for non-majors. Together with BIOL 270, the prerequisite or co-requisite, BIOL 270L aims to provide a basic overview of ecological processes that will generate a basis for understanding modern environmental issues and their importance to contemporary society. Students will have the opportunity to learn basic ecological processes and the effects of human population growth and technology through laboratory exercises, data analyses, discussions, and research. BIOL 270L emphasizes the scientific inquiry as a method of understanding the natural world and focuses on the use of experimental design and technology to solve questions of environmental function. Additionally, the importance of biological scientific literacy to understanding and analyzing the impact of contemporary issues such as water supply and quality, energy, world population growth, sustainability, and climate change to human health and welfare will be emphasized.

ITEMIZED LEARNING OUTCOMES

Upon successful completion of Biology 270L, students will be able to:

1. Distinguish scientific inquiry from other legitimate methods of inquiry and to recognize the difference between scientifically legitimate inquiry and claims without a sound scientific basis.
2. Apply statistical and quantitative approaches to analyze data
3. Demonstrate understanding of the scientific method
4. Explain the basics of experimental design and hypothesis testing
5. Collect and properly handle environmental samples
6. Explain measurement error and the difference between precision and accuracy
7. Use simple population models to forecast growth and understand the consequences of changing demographic parameters

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. Lab Manual: Morris, J.T. 2011. *Biology 270 Laboratory Manual*

SAMPLE ASSIGNMENTS AND/OR EXAMS

1. The laboratory includes short lectures, independent individual or group work, videos, demonstrations, and discussions.
2. Oral presentations and participation in discussions
3. Written laboratory reports
4. Other written assignments, graphs, quizzes, bibliographies etc.
5. Attendance

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

Week 1: Introduction to the Course
Laboratory Information

Week 2: Problems of the “Hidden City”
Questions for reflections and discussion

Week 3: Basic Skills Laboratory: Introduction to Statistics
The means and measures of central tendency
Standard deviation: A measure of dispersion around the mean
Test your understanding: questions for review
Laboratory exercises on statistics
Test your understanding: questions for review
Laboratory exercise on statistics: human allometry
References and further reading

Week 4: Basic Skills Laboratory: Introduction to EXCEL 2000
Using EXCEL to analyze data on the PC
Getting into EXCEL 2000
Analysis of human allometry data
Graphical presentation and interpretation of the results

Week 5: Darwin’s Voyage
Who was Charles Darwin?
Darwin and the Theory of Evolution
The Controversy Over Evolution
How to read the *Autobiography*
Conclusions
Questions for Review and Study
Group assignments
A Partial Annotated Bibliography of Books by Charles Darwin
References Cited and Suggested Reading

- Week 6:** Gray Water Bioassay Experiment
Our Experiment
Methods
Data analysis
Assignment
Seed Germination Data Sheet
- Week 7:** A Discussion of China's Only One Child Program
- Week 8:** World Population Simulation Games
The Default Simulation
Step through One Year at a Time
Changing the Parameter Values
- Week 9:** The Trial
Trial format
Trial topics
- Week 10:** Collection and Investigation of Local Water Samples
In-lab work
The Great Oyster Experiment
- Week 11:** Radiation Laboratory Exercise: Part I
Introduction: Characteristics of radiation
Instructions for using the AW-SRAD radiation monitor
The effect on different blocking materials on the penetration of radiation
- Week 12:** Radiation Laboratory Exercise: Part II
Determination of the inverse square relationship
A review of the concept of half-life
Assignment: radiation homework sheet
- Week 14:** Conclusion