TAFTCOLLEGE

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Biology (BIOL) C1000 Introduction to Biology with Lab (4 Units) CSU:UC
[formerly Biology 1510]

Prerequisites: None

Co-Requisites: None

Advisory: Eligibility for English C1000, C1000E, 1502 strongly recommended

Total Hours: 48 hours lecture; 96 hours outside class; 48 hours lab (192 hours total)

Catalog Description:

Part 1 (Identical and Required):
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.

Type of Class/Course: Degree Credit

Representative Texts, Manuals, OER and Other Support Materials:

Part 1 (Identical and Required):
Texts used by individual institutions and even individual sections will vary.

Textbooks:

OER Example:

• Fowler, S., Wise, J., & Roush, R. (2024). Concepts of Biology. OER: OpenStax. https://openstax.org/books/concepts-biology/pages/1-introduction

Traditional Examples:

• Hoefnagels, M. (2021). Biology: The Essentials. 4th ed.: McGraw Hill.
• Taylor, M., Simon, E., Dickey, J., & Reece, J. (2020). Campbell Essential Biology. 7th ed.: Pearson.

Lab manuals:

An example of a publisher lab manual is:
• Bres, M., & Weisshaar, A. (2018). Thinking About Biology: An Introductory Lab Manual

(What's New in Biology). 6th ed.: Pearson.
• Locally developed manual

Part 2 List Sample Textbooks, Manuals, or Other Support Materials (optional):
Textbook: Johnson, George B. *The Living World*. 11th ed. Boston: McGraw-Hill, 2024.

Lab Manual: Lytle, Steve *BIOL C1000 Laboratory Manual*. Taft College Print Shop. 2025

Additional Required Materials: None

Course Objectives:

Part 1 (Identical and Required):
At the conclusion 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.

Part 2 Optional objectives/outcomes (optional):
At the conclusion of this course, the student should be able to:

Course Level Student Learning Outcomes

Identify and explain the definitive characteristics of living organisms in a clear and concise manner.

Local General Education Learning Outcomes
1. Develop an understanding of the relationship between science and other human behaviors.
2. Demonstrate the scientific method.

Course Scope and Content (Lecture):

Part 1: Required Topics (Identical):
1. The scientific method and the process of science
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
    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 ecosystems
    e. Human interactions with the biosphere
    f. Conservation biology and sustainability

Course Scope and Content (Laboratory):

Part 1: Required Topics (Identical):
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

Representative Assignments

Reading:
Weekly readings from textbook chapters and supplemental science articles.

Writing:
Short written responses in discussion, vocabulary-based writing assignments, and essay-style questions on exams.

Learning Activities Required Outside of Class:

The students in this class will spend a minimum of 6 hours per week outside of the regular class time doing the following:

1. Studying text, chapter handouts and learning objectives,
2. Answering questions,
4. Completing required reading,
5. Problem solving activity or exercise, and
6. Written work.

Methods of Instruction:

1. Assigned readings from text and selected references,
2. Lecture and demonstration by instructor,
3. Multimedia presentations,
4. Field trips, and
5. Hands-on laboratory exercises.

Methods of Evaluation:

Part 1 (Identical and Required):
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.

Laboratory Category: Extensive Laboratory

Pre delivery criteria: All of the following criteria are met by this lab.

1. Curriculum development for each lab.
2. Published schedule of individual laboratory activities.
3. Published laboratory activity objectives.
4. Published methods of evaluation.
5. Supervision of equipment maintenance, laboratory setup, and acquisition of lab materials and supplies.

During laboratory activity of the laboratory: All of the following criteria are met by this lab.
1. Instructor is physically present in lab when students are performing lab activities.
2. Instructor is responsible for active facilitation of laboratory learning.
3. Instructor is responsible for active delivery of curriculum.
4. Instructor is required for safety and mentoring of lab activities.
5. Instructor is responsible for presentation of significant evaluation.

Post laboratory activity of the laboratory: All of the following criteria are met by this lab.

1. Instructor is responsible for personal evaluation of significant student outcomes (lab exercises, exams, practicals, notebooks, portfolios, etc.) that become a component of the student grade that cover the majority of lab exercises performed during the course.
2. Instructor is responsible for supervision of laboratory clean up of equipment and materials.

Supplemental Data:

TOP Code:	040100 - Biology
SAM Priority Code:	E: Non-Occupational
Funding Agency:	Y: Not Applicable
Program Status:	1: Program Applicable
Noncredit Category:	Y: Not Applicable
Special Class Status:	N: Course is not a special class
Basic Skills Status:	N: Not Applicable
Prior to College Level:	Y: Not Applicable
Cooperative Work Experience:	N: Course is not a part of a cooperative education program
Eligible for Credit by Exam:	No
Eligible for Pass/No Pass:	Yes
Discipline	Biological Sciences