



## AUCC 3A. BIOLOGICAL & PHYSICAL SCIENCES

### DESCRIPTION

Biological and Physical Science courses examine scientific perspectives, build familiarity with scientific knowledge and the scientific method, develop competencies in reasoning, inquiry, and analysis and evaluate the impacts of science and technology on society to facilitate communication in an increasingly complex and technological world. At least one course used to satisfy this requirement must have a laboratory component.

### CONTENT CRITERIA

**Content Competencies** are the knowledge, methods, concepts, and content-related learning that students should learn from participation in a course.

Upon successful completion of a LECTURE course in this category, students should be able to:

1. Develop foundational knowledge in specific field(s) of science.
2. Develop an understanding of the nature and process of science.
3. Demonstrate the ability to use scientific methodologies.
4. Examine quantitative approaches to study natural phenomena.
5. Develop concepts of accuracy, precision, and the role of repeatability in the acquisition of scientific knowledge.
6. Demonstrate the ability to recognize connections between the specific subject matter being taught and other areas of scientific endeavor or human activity.

Upon successful completion of a LAB course or section, students should be able to:

1. Perform hands-on activities with demonstration and simulation components playing a secondary role.
2. Engage in inquiry-based activities.
3. Demonstrate the ability to use the scientific method.
4. Obtain and interpret data and communicate the results of inquiry.
5. Demonstrate proper technique and safe practices.

### CORE STUDENT LEARNING OUTCOMES

**Core Student Learning Outcomes** are transferable skills that students learn and apply through participation in the AUCC.

#### INQUIRY & ANALYSIS

- 1) Select or Develop a Design Process
  - ★ Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
- 2) Analyze and Interpret Evidence
  - ★ Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
  - ★ Utilize multiple representations to interpret the data.
- 3) Draw Conclusions
  - ★ State a conclusion based on findings.

#### QUANTITATIVE LITERACY

- 4) Interpret Information
  - ★ Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
- 5) Represent Information
  - ★ Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

## PLANNING AND TEACHING AN AUCC COURSE

### ALIGN THE LEARNING ACTIVITIES TO THE COURSE OUTCOMES

**Map course activities and content** to the course learning outcomes. Does the course allow ample opportunities for students to learn and practice what they need to know and do to be successful?

**Plan learning experiences, instruction, and resources** that will help students reach the learning outcomes. The course should challenge students to build higher-order skills and use active and engaged forms of learning.

**Create structured activities that help students scaffold learning.** Break down large tasks or concepts and build smaller steps so that students can gain competence. Small, simple assignments build skills that help students accomplish something more complex. Give students opportunities to practice and repeat learning tasks.

**Communicate the learning outcomes to students.** Tag assignments with the course learning outcomes and talk with students about what they are learning and how it fits into the bigger picture of the course, the AUCC, or their university education.

### PLAN AHEAD TO ASSESS LEARNING

**Determine acceptable evidence** that students are achieving the learning outcomes. This includes formative assessments to check progress and summative assessments that measure achievement. Both kinds of assessments should build upon each other and are sequenced with learning activities.

**Start with the end in mind.** Decide how you will evaluate the assignment at the same time you create it. What are the priorities of the assignment? Are the priorities appropriately weighted in the grading plan?

**Communicate expectations to students.** Share rubrics, scales, or grading frameworks with students when you assign the work, or as they progress. Ensure there will be opportunities to get feedback or make revisions before students submit the final result of their work.

**Provide early, frequent, and immediate feedback.** Students need regular feedback on their performance, so they know how to focus their studies, when to work harder, and when to ask for help. To be effective, students need to know what they are doing well, what they need to work on, and how they can improve. Use specific and constructive language. CSU's **First Four Weeks** Initiative offers a structured start.

**Consider a pre-assessment.** In what ways can you learn about a student's preparation for the course? What are their strengths and where do students need additional support to meet course expectations?

## RESOURCES

Assessment at CSU

<https://assessment.colostate.edu/>

VALUE Rubrics

<https://www.aacu.org/initiatives/value-initiative/value-rubrics>

The Institute for Teaching and Learning (TILT)

<https://tilt.colostate.edu/>

First Four Weeks Initiative

<https://tilt.colostate.edu/prodev/teaching-effectiveness/tef/feedback-and-assessment/fa-first-four-weeks/>