Cerro Coso College

# Course Outline of Record Report

**10/11/2021**

# BIOLC105H : Concepts of Biology Honors

## General Information

| | |
|---|---|
| **Author:** | - |
| **Course Code (CB01) :** | BIOLC105H |
| **Course Title (CB02) :** | Concepts of Biology Honors |
| **Department:** | Science |
| **Proposal Start:** | Fall 2013 |
| **TOP Code (CB03) :** | (0401.00) Biology, General |
| **SAM Code (CB09) :** | Non-occupational |
| **Distance Education Approved:** | No |
| **Course Control Number (CB00) :** | CCC000041306 |
| **Curriculum Committee Approval Date:** | 03/04/2016 |
| **Board of Trustees Approval Date:** | 04/14/2016 |
| **External Review Approval Date:** | 04/29/2011 |
| **Course Description:** | This is an introductory course in biological science with laboratory experience for non-majors. The course illustrates the principles of organization, cell structure and function, genetics, metabolism, organ systems, reproduction (plant and animal), ecology, evolution, and animal behavior. The course is not open to students with credit in BIOL C101. The honors course provides more content and requires greater intensity and depth of study than the non-honors class. |
| **Submission Type:** | New Course |
| **Author:** | No value |

## Faculty Minimum Qualifications

| | |
|---|---|
| **Master Discipline Preferred:** | • Biological Sciences |
| **Alternate Master Discipline Preferred:** | • Biological Sciences |
| **Bachelors or Associates Discipline Preferred:** | No value |
| **Additional Bachelors or Associates Discipline Preferred:** | No value |

## Course Development Options

**Basic Skills Status (CB08)**

Course is not a basic skills course.

☐ Allow Students to Gain Credit by Exam/Challenge

**Course Special Class Status (CB13)**

Course is not a special class.

**Allowed Number of Retakes**

0

**Grade Options**

- Letter Grade Methods
- Satisfactory Progress

**Course Prior To College Level (CB21)**

Not applicable.

**Rationale For Credit By Exam/Challenge**

No value

**Retake Policy Description**

Type:|Non-Repeatable Credit

☑ Allow Students To Audit Course

**Course Support Course Status (CB26)**

No value

## Associated Programs

☑ Course is part of a program (CB24)

| Associated Program | Award Type | Active |
|---|---|---|
| CC Liberal Arts: Mathematics & Science | A.A. Degree Major | Summer 2018 to Fall 2020 |
| CC Psychology for Transfer | A.A. Degree for Transfer | Spring 2018 |
| CSU General Education (CSU GE Breadth) | Certificate of Achievement | Fall 2020 |
| Intersegmental General Education Transfer Curriculum Certificate of Achievement | Certificate of Achievement | Fall 2020 |
| Liberal Arts: Mathematics & Science Associate in Arts Degree | A.A. Degree Major | Fall 2020 |
| CSU General Education (CSU GE Breadth) (In Development) | Certificate of Achievement | Fall 2021 |
| Intersegmental General Education Transfer Curriculum Certificate of Achievement (In Development) | Certificate of Achievement | Fall 2021 |

## Transferability & Gen. Ed. Options

**Course General Education Status (CB25)**

No value

**Transferability**

Transferable to both UC and CSU

**Transferability Status**

Approved

| Cerro Coso General Education Requirements | Categories | Status | Approval Date | Comparable Course |
|---|---|---|---|---|
| Area 1.1 | Natural Science<br>Life Sciences | Approved | No value | No Comparable Course defined. |

| Intersegmental General Education Transfer Curriculum | Categories | Status | Approval Date | Comparable Course |
|---|---|---|---|---|
| Area 5.B | Physical & Biological Sciences<br>Biological Science | Approved | No value | No Comparable Course defined. |
| Area 5.C | Physical & Biological Sciences<br>Laboratory/Activity | Approved | No value | |

| CSU General Education Certification | Categories | Status | Approval Date | Comparable Course |
|---|---|---|---|---|
| Area B.2 | Scientific Inquiry & Quantitative Reasoning<br>Life Science | Approved | No value | No Comparable Course defined. |
| Area B.3 | Scientific Inquiry & Quantitative Reasoning<br>Laboratory | Approved | No value | |

## Units and Hours:

### Summary

| | |
|---|---|
| **Minimum Credit Units (CB07)** | 5 |
| **Maximum Credit Units (CB06)** | 5 |
| **Total Course In-Class (Contact) Hours** | 126 |
| **Total Course Out-of-Class Hours** | 144 |
| **Total Student Learning Hours** | 270 |
| **Faculty Load** | 0 |

### Credit / Non-Credit Options

**Course Credit Status (CB04)**

Credit - Degree Applicable

**Course Non Credit Category (CB22)**

Credit Course.

**Non-Credit Characteristic**

No Value

**Course Classification Status (CB11)**

Credit Course.

☐ Variable Credit Course

**Funding Agency Category (CB23)**

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

## Weekly Student Hours

| | In Class | Out of Classs |
|---|---|---|
| Lecture Hours | 4 | 8 |
| Laboratory Hours | 3 | 0 |
| Activity Hours | 0 | 0 |

## Course Student Hours

| | |
|---|---|
| **Course Duration (Weeks)** | 18 |
| **Hours per unit divisor** | 0 |
| **Course In-Class (Contact) Hours** | |
| Lecture | 0 |
| Laboratory | 0 |
| Activity | 0 |
| **Total** | 126 |
| **Course Out-of-Class Hours** | |
| Lecture | 0 |
| Laboratory | 0 |
| Activity | 0 |
| **Total** | 144 |

## Time Commitment Notes for Students

No value

## Faculty Load

**Extra Duties:** 0

**Faculty Load:** 0

## Units and Hours: - Weekly Specialty Hours

| Activity Name | Type | In Class | Out of Class |
|---|---|---|---|
| No Value | No Value | No Value | No Value |

## Pre-requisites, Co-requisites, Anti-requisites and Advisories

### Prerequisite

ENGLC070 - Introductory Composition

Students are expected to read a college-level textbook, scientific journal articles and assigned internet readings with sufficient comprehension to be able to identify central points of reading materials, and to distinguish facts from opinions, identifying bias and drawing inferences. Students are also expected to be able to write summaries of assigned readings, answer homework questions using paragraph-length responses in clear and error-free prose, and complete lab reports. Honors students are required to write a research paper of no less than 2500 words summarizing central points from multiple reference sources using appropriate documentation system such as MLA or APA. ENGL C070 provides the student with the requisite reading and writing skills to meet these expectations. The placement at this level is a requirement of the Honors Committee.

## Entrance Skills

| Entrance Skills | Description |
| --- | --- |
| No value | No value |

## Limitations on Enrollment

| Limitations on Enrollment | Description |
| --- | --- |
| **Prerequisite: Acceptance to the Honors Program or eligibility for this honors course as determined by the instructor. Students are expected to be able to read and comprehend challenging scientific materials, and to analyze in depth a chosen topic appropriate for intensified study. Students to demonstrate ability to maintain a minimum standard of coursework at the honors level.** | Prerequisite:<br>Acceptance to the Honors Program or eligibility for this honors course as determined by the instructor. Students are expected to be able to read and comprehend challenging scientific materials, and to analyze in depth a chosen topic appropriate for intensified study. Students to demonstrate ability to maintain a minimum standard of coursework at the honors level. |

## Specifications

### Methods of Instruction

| | |
| --- | --- |
| **Methods of Instruction** | Written work |
| **Rationale** | No value |
| **Methods of Instruction** | Project-based learning |
| **Rationale** | No value |
| **Methods of Instruction** | Presentations (by students) |
| **Rationale** | No value |
| **Methods of Instruction** | Outside reading |
| **Rationale** | No value |
| **Methods of Instruction** | Library |
| **Rationale** | No value |

| | |
|---|---|
| **Methods of Instruction** | Lecture |
| **Rationale** | No value |
| **Methods of Instruction** | Guest Lecturers |
| **Rationale** | No value |
| **Methods of Instruction** | Laboratory |
| **Rationale** | No value |
| **Methods of Instruction** | Discussion |
| **Rationale** | No value |
| **Methods of Instruction** | Field Trip |
| **Rationale** | No value |
| **Methods of Instruction** | Demonstration |
| **Rationale** | No value |

### Assignments

**Readings from the assigned textbook. Example: The student is expected to read the weekly reading assignments from the text which relate to the lecture topic prior to the lecture.**
**Outlining the chapters and incorporating lecture notes with chapter outlines. Example: Students are expected to outline the assigned text reading and to relate and integrate the outlines with the lecture notes.**
**Homework assignments. Example: The student is expected to answer the instructor assigned questions from the relevant text chapters and additional instructional materials other than the text.**
**Written laboratory reports. Example: The student is required to write a formal lab report in a format consistent with that published in a scientific journal. The report summarizes the laboratory methods performed, data collected, and data analysis for each week's lab activity. Data should be analyzed in the context of the experiment's hypothesis, and to make conclusions for the experiment.**

| Methods of Evaluation | Rationale |
|---|---|
| Other | Laboratory Experiments: Laboratory experiments are designed to provide hands on learning for concepts discussed in lecture. Example: The effects of hypertonic and hypotonic solutions on cells are examined under the microscope to illustrate osmosis. |
| Research Paper | Honors students are required to write a research paper of no less than 2500 words summarizing central points from multiple reference sources using appropriate documentation system such as MLA or APA. Oral presentation of the research paper is also required. Both are scored with a rubric. |
| Tests | Quizzes: Quizzes covering topics from lecture material and reading assignments are given. Example: A quiz covering sub atomic particles and bonds is given to assess students' |

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|---|---|
| | understanding of these concepts.<br><br>Exams: Exams covering the material covered in lecture and reading assignments are given to assess student learning. Example: Exam one covers the scientific method, chemistry of life, biological molecules, cell biology, energy flow in biological systems, cellular respiration, and photosynthesis. The exam can be but is not limited to multiple choice, true/false, short answer and essay. |
| Homework | Homework Assignments: Students are asked to assimilate the assigned reading material. Example: Read chapter 2. Student should read chapter 2 and assimilate material. Method of material assimilation is not prescribed. It is suggested that students outline chapters, answer study questions in the text, utilize on-line materials provided by the text publisher, and form study groups. |

**Equipment**

No Value

**Textbooks**

| Author | Title | Publisher | Date | ISBN |
|---|---|---|---|---|
| | Simon, E.J., Dickey, J.L., Reece, J.B. & Hogan, K.A. (2015) Essential Biology with Physiology, 5th Edition, Benjamin Cummings | | | |

**Other Instructional Materials**

| | |
|---|---|
| **Description** | Other: Current articles from Scientific American, Science, Science News, etc. Assignments on the Internet |
| **Author** | |
| **Citation** | Concepts of Biology Honors |
| **Description** | Other: Lab Manual developed on-site. |
| **Author** | |
| **Citation** | Concepts of Biology Honors |

**Materials Fee**

No

## Learning Outcomes and Objectives

**Course Objectives**

Define key biological terms and apply basic biological concepts.

Describe important processes of the cell including chemistry, cellular structures, energy flow, protein synthesis, cellular reproduction and inheritance.

Apply the concepts of evolutionary biology and natural selection to organism form and function.

Distinguish key features of the domains and kingdoms of organisms.

Compare and contrast the form and function of important organ systems of animals and plants.

Learn ecological processes of populations, communities, ecosystems and the biosphere to understand the biological impacts of local and global policies and actions.

Apply biological knowledge, principles and skills to understand bioethical issues, and to use these as foundations for lifelong learning.

Demonstrate an understanding of the scientific method and the philosophy of science by designing components of experiments and carrying out exercises safely.

Analyze a topic appropriate for intensified study beyond the scope of the non-honors class, using university-level readings and vocabulary and demonstrating intellectual autonomy. This project will result in a research paper or oral presentation based on research—both scored by a rubric—or a graded exam.

**CSLOs**

**Use biological information literacy to read, analyze and comprehend scientific literature.** Expected SLO Performance: 70.0

| | |
|---|---|
| *Science*<br>Liberal Arts: Mathematics & Science AA Degree | Describe the nature of science, the methods applied in scientific investigations, and the value of those methods in developing a rigorous understanding of the physical world. |

**Describe core biological processes at the cellular, tissue, organs and organ systems level, including chemistry, cellular structures, energy flow, protein synthesis, cell reproduction and inheritance.** Expected SLO Performance: 70.0

**Apply key concepts of evolutionary biology and natural selection to explain the unity and diversity of all living organisms.** Expected SLO Performance: 70.0

| | |
|---|---|
| *Science*<br>Liberal Arts: Mathematics & Science AA Degree | Apply algebraic, graphical, numerical, and other methods to solve applied problems in the areas of mathematics, natural sciences, computer graphics, and computer animation. |

**Compare and contrast ecological processes of populations, communities, ecosystems and the biosphere.** Expected SLO Performance: 70.0

| | |
|---|---|
| *Social Science*<br>Psychology AA Degree for Transfer | 1. The student will be able to apply psychological principles to the development of interpersonal, social, and occupational skills. Assessment:Examination through the use of multiple choice and short answer. |

**Relate key biological advancements to their applications in daily life.** Expected SLO Performance: 70.0

| | |
|---|---|
| *Social Science* PLOs for CSU GE COA | Communicate scientific results by applying the appropriate scientific method, including experimental and empirical methodologies characteristic of science and modern methods and tools used in scientific inquiry through the use of graphs, oral communications, and writings. |
| *Social Science* IGETC PLOs | Communicate scientific results by applying the appropriate scientific method, including experimental and empirical methodologies characteristic of science and modern methods and tools used in scientific inquiry through the use of graphs, oral communications, and writings. |

**Perform lab skills correctly using the scientific method, and display a habit of accurate and safe lab practices.** Expected SLO Performance: 70.0

| | |
|---|---|
| *Social Science* Psychology AA Degree for Transfer | 3. The student will be able to evaluate psychological data and apply the scientific method to psychological theory. Assessment:The student will complete a research project scored by a rubric. |

**Design an independent study and critically analyze knowledge on a specific area in biology.** Expected SLO Performance: 70.0

## Outline

**Course Outline**

A. Scientific Method
B. Characteristics of Life
C. Chemistry of Life
    1. Atomic Structure
    2. Chemical Bonding
D. Biological Molecules
    1. Organic Molecule Synthesis
    2. Carbohydrates
    3. Lipids
    4. Proteins
    5. Nucleic Acids
E. Cell Structures
    1. Membrane Structure
    2. Substances Crossing Membrane
    3. Prokaryotic Cell Structures
    4. Eukaryotic Cell Structures
F. Energy Flow in Life
    1. Energy Flow in Chemical Reactions
    2. Control of Metabolic Reactions
G. Photosynthesis
    1. Light-Dependent Reactions
    2. Light-Independent Reactions
H. Glucose Metabolism
    1. Glycolysis
    2. Cellular Respiration
I. DNA
    1. Structure and Function
    2. Replication
J. Gene Expression and Regulation
    1. Relationship between Genes and Proteins
    2. Transcription
    3. Translation
    4. Mutations and Genes
    5. Gene Regulation
K. Cellular Reproduction

1. Function of Cellular Reproduction
2. Cell Cycle
3. Mitosis
4. Cytokinesis
5. Meiosis
6. Meiosis, Sexual Reproduction and Variability

L. Inheritance
1. Mendel and the Foundations of Inheritance
2. Single Trait Inheritance
3. Multiply Trait Inheritance
4. Sex Determination
5. Variations on Mendelian Genetics
6. Human Genetic Disorders

M. Biotechnology - Uses and Applications

N. Foundations of Evolution
1. Definition of Evolution
2. Darwin and His Ideas
3. Evidence for Evolution

O. Evolution in Populations
1. Gene Pool of a Population
2. Five Causes of Evolution
3. Natural Selection in Detail

P. Origin of Species
1. Allopatric and Sympatric Speciation
2. Maintenance of Reproductive Isolation
3. Causes of Extinction

Q. Systematics
1. Naming and Classifying Organism
2. Domains and Kingdoms
3. Biological Species Concept and Its Limitations
4. Phylogenetic Trees

R. Biodiversity of Microbes
1. Viruses
2. Bacteria and Archea
3. Single-Celled Eukaryotes

S. Biodiversity of Fungi and their Key Features

T. Biodiversity of Plants
1. Key Features
2. Evolutionary Origin of Plants
3. Colonization of Land

U. Biodiversity of Animals
1. Key Features
2. Major Branch Point of Evolutionary Tree
3. Survey of Phyla

V. Plant Form and Function
1. Roots
2. Stems
3. Leaves
4. Transport of Water
5. Transport of Sugars

W. Plant Reproduction
1. Pollination and Fertilization
2. Seed and Fruit Development
3. Seed Germination

X. Animal Circulation
1. Heart
2. Blood
3. Types and Functions of Blood Vessels
4. Lymphatic System

Y. Respiration
1. Gas Exchange
2. Human Respiratory Structures

Z. Digestion
1. Survey of Important Nutrients
2. Process of Digestion
3. Human Digestive Structures

AA. Immune System

1. Body's Defense System
2. Immune Response
3. Immune System Malfunctions

BB. Animal Reproduction
1. Types of Reproduction
2. Human Reproductive System
3. Limiting Fertility

CC. Population Ecology
1. Population Growth and Regulation
2. Human Population Growth

DD. Community Ecology
1. Competition
2. Predator-Prey Interactions
3. Symbiosis
4. Community Structure

EE. Ecosystem Ecology
1. Energy Flow
2. Nutrient Flow
3. Global Warming

FF. Biomes
1. Factors Influencing Weather and Climate
2. Life Distributed on Land
3. Life Distributed in Water

GG. Honors students choose a research project from the topics covered in the course. Students examine the topic in much greater detail, requiring at least three review papers from scientific journals, and make an oral presentation on the topic.

**Lab Outline**

Laboratory Experiments
1. Lab Safety
2. Scientific Method
3. Microscopy
4. Cells and Osmosis
5. Metabolism
6. Photosynthesis
7. Cell Division
8. Heredity
9. Molecular Dogma
10. Gel Electrophoresis
11. Natural Selection
12. Topics in Evolution
13. Circulatory System
14. Respiratory System
15. Reproductive system
16. Fetal Pig Dissection
17. Plant Survey
18. Plant Reproduction
19. Biomes

Laboratory exercises are designed to complement and reinforce the understanding of lecture materials. Example: The effects of hypertonic and hypotonic solutions on cells are examined in experiments to illustrate the mechanism of osmosis.

Laboratory exercises also introduce students to proper laboratory practices and hypothesis driven inquiry. Students will learn to use the scientific method in designing and conducting experiments, analyzing data, and make inferences from the results obtained.

## Delivery Methods and Distance Education

**Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings ("Hybrid") -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other**

Face 2 Face

**Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section?**

No Value

**Effective Student-Instructor Contact: Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Moodle Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV -Interactive Video -Other (specify)**

email

**Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?**

No Value

**Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.**

itv
learning management system
publisher

**Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.**

No Value