Cerro Coso College

Course Outline of Record Report

10/11/2021

BIOLC111H : General Biology I Honors

General Information

Author:	-
Course Code (CB01) :	BIOLC111H
Course Title (CB02) :	General Biology I Honors
Department:	Science
Proposal Start:	Fall 2013
TOP Code (CB03) :	(0401.00) Biology, General
SAM Code (CB09) :	Non-occupational
Distance Education Approved:	Yes
Course Control Number (CB00) :	CCC000093679
Curriculum Committee Approval Date:	04/15/2016
Board of Trustees Approval Date:	06/09/2016
External Review Approval Date:	04/29/2011
Course Description:	This is an introductory course for students majoring in biological sciences and related subjects. The course covers principles of cell biology, metabolism, biochemistry, molecular biology, genetics, and physiology. 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.

Course Special Class Status (CB13)

Course is not a special class.

Grade Options

- Letter Grade Methods
- Pass/No Pass

☐ Allow Students to Gain Credit by Exam/Challenge

Allowed Number of Retakes

0

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
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 Life Sciences	Approved	No value	BIOL 190

CSU General Education Certification	Categories	Status	Approval Date	Comparable Course
Area B.2	Scientific Inquiry & Quantitative Reasoning Life Science	Approved	No value	BIOL 190
Area B.3	Scientific Inquiry & Quantitative Reasoning Laboratory	Approved	No value	

Intersegmental General Education Transfer Curriculum	Categories	Status	Approval Date	Comparable Course
Area 5.B	Physical & Biological Sciences Biological Science	Approved	No value	No Comparable Course defined.

Units and Hours:

Summary

Minimum Credit Units (CB07)	6
Maximum Credit Units (CB06)	6
Total Course In-Class (Contact) Hours	144
Total Course Out-of-Class Hours	180
Total Student Learning Hours	324
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.

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Classs
Lecture Hours	5	10
Laboratory Hours	3	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	

Activity Hours	0	0

Lecture	0
Laboratory	0
Activity	0
Total	144

Course Out-of-Class Hours

Lecture	0
Laboratory	0
Activity	0
Total	180

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

CHEMC101 - Introduction to Chemistry

Content Review: Students in BIOL C111 work with acids, bases, buffers and pH of living systems. Molarity and molality calculations, osmotic pressure and diffusion in relation to the function of living systems are also covered. Knowledge of basic chemical concepts such as atomic structures, chemical bondings, functional groups, and redox reactions allow students to comprehend more complex biochemical reactions encountered in biology.

AND

Prerequisite

ENGLC070 - Introductory Composition

Content Review: 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.

AND

Prerequisite

MATHC055 - Intermediate Algebra

Content Review: In BIOL C111 students need to be able to convert numbers to scientific notation, solve genetics problems, annotate word problems mathematically, and perform elementary probability and statistical analysis. Students also need to be able to convert from one unit of measurement to another and solve pH calculations. Students that have not had MATH C055 or equivalent cannot perform these calculations with enough proficiency to be successful.

Entrance Skills

Entrance Skills	Description
No value	No value

Limitations on Enrollment

Limitations on Enrollment	Description
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.	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	Other
Rationale	Classroom lecture and discussion of all course content. Presentations utilizing power point, chalkboard, whiteboard and internet. Laboratory exercises relating to lecture topics. Bacterial Transformation Laboratory: Students transform Escherichia coli with a plasmid containing the fluorescent green protein from jelly fish. Transformation rates are calculated and compared.
Methods of Instruction	Written work
Rationale	No value

Methods of Instruction	Project-based learning
Rationale	No value
Methods of Instruction	Problem Solving
Rationale	No value
Methods of Instruction	Library
Rationale	No value
Methods of Instruction	Outside reading
Rationale	No value
Methods of Instruction	Lecture
Rationale	No value
Methods of Instruction	Laboratory
Rationale	No value
Methods of Instruction	Guest Lecturers
Rationale	No value
Methods of Instruction	Field Trip
Rationale	No value
Methods of Instruction	Demonstration
Rationale	No value
Methods of Instruction	Discussion
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. Research a topic, use library resources to access scientific journals, write research paper.

Methods of Evaluation	Rationale
Other	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.
Other	G. Laboratory Experiments: Laboratory experiments are designed to provide hands on learning for concepts discussed in lecture. E.g. The effects of hypertonic and hypotonic solutions on cells are examined under the microscope to illustrate osmosis.
Other	F. Three to four exams, multiple choice and essay, covering lecture and assigned reading material.
Other	E. Internet assignments, such as locating and utilizing scientific databases and articles.
Other	D. Two lab practicals requiring students to propose, evaluate, and/or formulate responses to materials presented.
Other	C. Lab reports and presentations
Other	B. Quizzes covering material from the assigned readings.
Other	A. Readings from the assigned texts, leading scientific journals (e.g. Science, Nature, EMBO Journal and Cell), and answering questions from the assigned materials.

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
	1. Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V., Jackson, R.B., Morgan, J.G., Brown Carter, M.E. . (2014) Biology, 10th, -Benjamin Cummings			

Other Instructional Materials

Description	Manuals: 1. Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V., Jackson, R.B., Morgan, J.G., Brown Carter, M.E. . (2013-10-23 00:00:00.0) Investigating Biology Manual, Pearson
Author	

Citation	General Biology I Honors

Materials Fee

No

Learning Outcomes and Objectives

Course Objectives

Describe the molecules that make-up living organisms and the properties of biological molecules, which allow them to carry out the chemical reactions of life.

Explain enzyme structure and function, and predict how they influence the enzymatic regulation of metabolic processes.

Explain cell structure and organization, and how they relate to cell functions for prokaryotic and eukaryotic cells.

Relate evolutionary processes to the origin and development of cells.

Explain how molecular biology, genetics, and cell development contribute to life at the cellular and organismal level.

Describe the basic tools and techniques of biotechnology, and assess how biotechnology impacts medicine, agriculture and society.

Recognize differences and similarities among the physiology of higher vertebrates and explain how organ systems maintain homeostasis.

Utilize library and internet biological resources in the study of biology and scientific writing.

Perform and design experiments relating to lecture material which demand implementation of the scientific method, and proper scientific formatting of lab reports.

Compare and contrast data and develop conclusions based upon gathered data.

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 an oral presentation based on three review papers from scientific journals.

CSLOs

Describe core biological processes and how organisms function at the molecular, cellular, tissue, organ and organ-system levels.
Expected SLO Performance: 70.0

Science 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.

Apply the fundamentals of chemistry and cell biology to explain how organ systems maintain homeostasis in higher vertebrates.
Expected SLO Performance: 70.0

Formulate research questions and apply the scientific method to design experiments, collect and analyze data, derive conclusions and write scientific reports.
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.
Science 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.
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.

Apply biological principles, knowledge, and skills to comprehend scientific literature, and to understand how biological ideas impacts society.
Expected SLO Performance: 70.0

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 an oral presentation based on three review papers from scientific journals.
Expected SLO Performance: 70.0

Outline

Course Outline

A. Molecules of life
   1. Properties of water
   2. Aqueous solutions
      a. Solute concentration
      b. Acids, bases, pH
   3. Carbon & molecular diversity
      a. Versatility of carbon in molecular architecture
      b. Isomers
      c. Functional groups
      d. Chemical elements of life

B. Structure and organization of the cell
   1. Microscopy
   2. Prokaryotic and eukaryotic cells
   3. Importance of compartmental organization
      a. Ribosomes
      b. Endomembrane system
         i. nucleus
         ii. Endoplasmic reticulumiii. Golgi

iv. Lysosomes v. Vacuoles vi. Plasma membrane vii. Peroxisomes
   a. Peroxisomes
   b. Mitochondria
   c. Chloroplasts
   d. Cytoskeleton
   e. Structure and organization of biological membranes

a. Models of membrane structure
b. Trafficking of small molecules
c. Selective permeability
d. Diffusion and passive transport
e. Osmosis
f. Facilitated diffusion
g. Active transport
h. Exocytosis & endocytosis, trafficking of large molecules

A. Introduction to metabolism
1. Energy
a. Forms of energy
b. Thermodynamics
2. Enzymes
a. Biological catalysts
b. Enzyme specificity
c. Feedback inhibition
3. Cellular energy & work
4. Cellular respiration
a. Redox
b. Anaerobic respiration, substrate level phosphorylation
c. Aerobic respiration, oxidative phophorylation
d. Photosynthesis, photophosphorylation
e. Cellular communication
B. Genetics and molecular biology
1. Mitosis
2. Meiosis
3. Mendilian genetics
4. DNA, replication
5. RNA, transcription
6. Protein, translation
7. Microbial models: the genetics of viruses and bacteria
a. Gene regulation prokaryotes
b. DNA technology
i. Cloning
ii. Restriction Fragment Length Polymorphismiii. Current biotechnology topics
8. Gene structure and regulation in eukaryotes
a. Chromatin and DNA packing
b. Control of gene expression
c. Molecular biology of cancer
9. Genetic regulation of development
a. Differential gene expression
b. Drosophila as a model of genetic control of development
C. Anatomy and physiology of higher vertebrates
1. Digestion
2. Circulation and gas exchange
3. Immune system
a. Non-specific response
b. Specific response
c. AIDS
d. Allergy
4. Homeostasis
5. Endocrine system
6. Reproduction
a. Asexual reproduction
b. Sexual reproduction
c. Human reproduction and sexually transmitted diseases
7. Nervous system
a. Neurons, membrane potentials, and synapses
b. Signal integration
8. Sensory and motor mechanisms
a. Sensory receptors
b. Muscles and glands

Honors students choose a research project from the topics covered in the course. Studentsexamine the topic in

much greater detail. Student present an oral presentation and/or a research paper on the topic. Students must present from three review papers from scientific journals.

Lab Outline

1. The Scientific Method
2. Enzyme Kinetics
3. Microscopy
4. Diffusion and Osmosis
5. Photosynthesis and Cellular Respiration
6. Cellular Division
7. DNA Isolation and Bacterial Transformation
8. Genetics
9. Fetal Pig Dissection
10. Human Blood and Circulation

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 true

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)

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.

No Value

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