BIO 10 Course Outline as of Fall 2013

CATALOG INFORMATION

Dept and Nbr: BIO 10 Title: INTRO PRIN BIOLOGY
Full Title: Introduction to Principles of Biology
Last Reviewed: 11/26/2012

← General/Basic Info

← Approval/Dates

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	8	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Title 5 Category: AA Degree Applicable
Grading: Grade or P/NP

← General/Basic Info

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

← General/Repeatability

Also Listed As:
Formerly:

← General/Basic Info

↙ Description/Catalog

Catalog Description:
Introductory course in biology including: scientific method, ecology, biodiversity, physiology and anatomy, chemistry of life, cell and molecular biology, genetics, and evolution.

Prerequisites:
Completion of MATH 150A or higher (V1) or Qualifying Test Score in Math and Course Completion of ENGL 100 or higher (V8) or ESL 100 or Qualifying Test Score in English

Corequisites:

Recommended Preparation:

Limits on Enrollment:

← Student Prep

Description/Schedule ↓

Schedule of Classes Information:
Description: Introductory course in biology including: scientific method, ecology, biodiversity, physiology and anatomy, chemistry of life, cell and molecular biology, genetics, and evolution.
(Grade or P/NP)

← General/Basic Info

Prerequisites: Completion of MATH 150A or higher (V1) or Qualifying Test Score in Math and Course Completion of ENGL 100 or higher (V8) or ESL 100 or Qualifying Test Score in English
Recommended:
Limits on Enrollment:

← Student Prep

Transfer Credit: CSU;UC.

General/Basic Info

Repeatability: Two Repeats if Grade was D, F, NC, or NP

General/Repeatability

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

Associate Degree:		Effective:	Fall 1981	Inactive:	
Area:	C	Natural Sciences			
CSU GE:	**Transfer Area**			Effective:	Inactive:
	B2	Life Science		Fall 1981	
	B3	Laboratory Activity			
IGETC:	**Transfer Area**			Effective:	Inactive:
	5B	Biological Sciences		Fall 1981	
	5C	Fulfills Lab Requirement			
CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:	
UC Transfer:	Transferable	Effective:	Fall 1981	Inactive:	

CID:

Articulation Module

Certificate/Major Applicable:
Both Certificate and Major Applicable

General/Basic Info

Approval and Dates

Approval/Dates

Version:	05	Course Created/Approved:	8/1/1981
Version Created:	4/16/2012	Course Last Modified:	7/27/2016
Submitter:	Tony Graziani	Course last full review:	11/26/2012
Version Status:	Approved (Changed Course)	Prereq Created/Approved:	11/26/2012
Version Status Date:	11/26/2012	Semester Last Taught:	Spring 2016
Version Term Effective:	Fall 2013	Term Inactive:	

COURSE CONTENT

Content/Outcomes and Objectives

Student Learning Outcomes:
Upon successful completion of this course students will be able to:
1. Apply the scientific method to investigating and evaluating biological phenomena.
2. Summarize the concept of evolution including the historical development, evidence and mechanisms, and apply these to patterns of biodiversity.
3. Integrate basic principles as they apply to biological systems, such as cellular processes, anatomy, physiology, genetics, ecology, and evolution.
4. Investigate how humans are impacted by ecological processes and relationships and how humans affect these.
5. Perform laboratory techniques, including microscopy, with a high level of expertise without assistance or instruction.

Objectives:
Upon completion of this course, student will be able to:
1. Apply the scientific method to biological investigation.
2. Apply laboratory techniques, including proper microscope use, to observing and

experimenting with biological phenomena.
3. Describe the role of biotic and/or abiotic factors to structuring biomes, ecosystems, communities, and populations, and how humans interact with these systems.
4. Correlate the structure and function of plant and animal organ systems, organs, tissues and cells.
5. Compare and contrast the cell structure and function of prokaryotic and eukaryotic cells and of plant and animal cells.
6. Explain the relationships between the structure of atoms, molecules, and biological polymers, and their significance to cells, physiology, genetics, and evolution.
7. Integrate knowledge of molecular genetics, inheritance, and cell division (mitosis and meiosis), and apply these to evolutionary biology.
8. Relate the mechanisms of evolution, adaptation, and speciation.
9. Recognize major evolutionary patterns and adaptations in the biodiversity of major taxa (domains, kingdoms, and phyla).
10. Describe the values, themes, methods, and history of biology and relate them to a course of study in the major.

Topics and Scope:

Content/Topics and Scope

1. Methods and philosophies of science
   A. Steps of the scientific method in laboratory experiments
   B. Sample size and statistical methods in testing hypotheses
2. Biological Organization: atoms to the biosphere
3. Ecology
   A. Introduction to the biosphere and major world biomes
   B. Ecosystems: nutrient cycles (water, carbon, nitrogen), energy flow, trophic structure
   C. Communities: niches, species interactions (resource partitioning, keystone species), co-evolution, succession
   D. Populations: structure, growth and regulation, human populations
4. Physiology
   A. Nutrition (autotrophic and heterotrophic), macromolecules, vitamins, and minerals
   B. Plant structure and function: nutrition, gas exchange, transport, and reproduction
   C. Comparative animal structure and function: nutrition and digestion, gas exchange, transport
   D. Surface to volume ratio
5. Classification and diversity of taxa: domain system, eukaryotic kingdoms and select phyla
   A. Distinguishing characteristics
   B. Specialization of structure and function
   C. Ecology and evolution
6. Chemistry
   A. Atomic structures and chemical bonding
   B. Properties of water (polarity and hydrogen bonding, cohesion and adhesion)
   C. States of matter
   D. pH
   E. Macromolecule synthesis, structure and function (carbohydrates, lipids, proteins, nucleic acids)
7. Cell Biology
   A. Prokaryotic and eukaryotic cell structure and function (organelles, cytoskeleton)
   B. Endosymbiotic hypothesis
   C. Cell membrane structure
   D. Transport: diffusion, osmosis, passive and active transport, endocytosis, and exocytosis
8. Metabolic Pathways

A. Enzyme: structure and function
B. Enzyme activity: effects of pH and temperature, positive and negative feedback loops
C. Photosynthesis light and photopigments
D. Photosynthesis (light-dependent and light-independent reactions): substrates, products, and location
E. ATP synthesis using chemiosmosis
F. Aerobic vs. anaerobic respiration
G. Respiration (glycolysis, Krebs cycle, and electron transport chain): substrates, products, and location

9. Cellular Reproduction
A. Mitosis
B. Meiosis including sources of genetic variation

10. Molecular Genetics
A. DNA replication
B. Protein synthesis and genetic code
C. Mutations and mutagens
D. Changes in chromosome number and chromosome structure

11. Transmission Genetics
A. Mendelian Genetics
B. Post Mendelian Genetics: partial dominance, multiple alleles, polygenic inheritance, autosomal linkage, sex linkage
C. Effects of environment on genetic expression

12. Development of Evolutionary Theory
A. Pre-Darwinian thought: static world view to Lamarckian evolution
B. Darwin and natural selection
C. Evidence for evolution

13. Mechanisms of Evolution
A. Microevolution: types of selection, gene flow, mutation, and genetic drift
B. Macroevolution: biological species, reproductive isolation mechanisms, speciation and adaptive radiation

14. The effect of past and current understanding of biological principles, topics, and methods on the human condition

15. Biology as a discipline

16. Laboratory Exercises
Compound and dissecting microscope use
Scientific method
Enzyme structure and function
Properties of water
Cell types and structures
Mitosis and meiosis
Mendelian genetics
Evolution
Eukaryotic biodiversity

Content/Assignment

Representative Assignments:

1. Assigned reading from texts and other assigned reading (approximately 25 pages/week).
2. Lab reports and/or essay assignments (2-4 pages).
3. Scientific method of analysis and interpretation of data (laboratory excercises) (approximately 1 per week).
4. Laboratory and/or lecture homework assignments, including genetic problems (approximately 1 per week).

5. Objective examinations including: multiple choice, short answer and/or essay, lecture exams (4 midterms, 1 final) and short answer laboratory exams (2-3 exams)
6. Demonstrate basic microscope skills (microscope quiz) (1 per semester).

Methods of Evaluation/Basis of Grade:

Content/MOE

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Lab reports or essay assignments	Writing 5 - 10%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments; laboratory exercises; genetics problems	Problem solving 2 - 10%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Use and care of microscopes	Skill Demonstrations 2 - 5%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, short answer and/or essay, lecture and lab exams (required)	Exams 65 - 80%

Other: Includes any assessment tools that do not logically fit into the above categories.

Class participation	Other Category 0 - 10%

Representative Textbooks:
Biology, Concepts and Connections, edition 7/e. Campbell, Reece, Taylor, Simon, Dickey. Pearson Benjamin Cummings: 2012.
Concepts of Biology, 2nd edition. Mader. McGraw-Hill: 2011.
Instructor prepared lab manual

Content/Textbooks

OTHER REQUIRED ELEMENTS

Student Prep

STUDENT PREPARATION

Matric Assessment Required:	B	Requires Both English & Math Assessment
Prerequisites-generate description:	U	User Generated Text
Advisories-generate description:	NA	No Advisory
Prereq-provisional:	N	NO
Prereq/coreq-registration check:	Y	Prerequisite Rules Exist
Requires instructor signature:	N	Instructor's Signature Not Required

BASIC INFORMATION, HOURS/UNITS & REPEATABILITY

General/Hours and Units & Repeatability

Method of instruction:	02	Lecture
	04	Laboratory
	99	Other/Unspecified Method of Instruction
Area department:	LIFESC	Life Sciences
Division:	73	Science, Technology, Engineering & Mathematics
Special topic course:	N	Not a Special Topic Course
Program status:	1	Both Certificate and Major Applicable
Repeatability:	00	Two Repeats if Grade was D, F, NC, or NP
Repeat group id:	N	Not in a repeat group

SCHEDULING

General/ Scheduling

Audit allowed:	N	Not Auditable
Open entry/exit:	N	Not Open Entry/Open Exit
Credit by exam:	Y	Credit by examination allowed
Budget code: Program:	0000	Unrestricted
Budget code: Activity:	0401	Life Science

OTHER CODES

Disciplines:	BIO	Biological Sciences (requires master's)
Basic skills:	N	Not a Basic Skills Course
Level below transfer:	Y	Not Applicable
CVU/CVC status:	N	Not Distance Ed
Non-credit category:	Y	Not Applicable, Credit Course
Classification:	Y	Liberal Arts and Sciences Courses
SAM classification:	E	Non-Occupational
TOP code:	0401.00	Biology, General
Work-based learning:	N	Does Not Include Work-Based Learning
DSPS course:	N	Not a DSPS Course
In-service:	N	Not an in-Service Course

General/Other Codes