BIO 10 Course Outline as of Fall 2009

CATALOG INFORMATION

Dept and Nbr: BIO 10 Title: INTRO PRIN BIOLOGY
Full Title: Introduction to Principles of Biology
Last Reviewed: 1/28/2019

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	10	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

Total Out of Class Hours: 105.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

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

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

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. Meets general education laboratory science requirement. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:

Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 1981	
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:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of this course, student will be able to:
1. Apply the steps in the scientific method to problem solving to biological investigation.
2. Apply laboratory techniques, including proper microscope use, to observing and experimenting with biological phenomena.
3. Understand 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. Show the relationships between the structure of atoms, molecules, biological polymers, and their significance to structure and function of 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. Synthesize knowledge of 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 the discipline and related them to a course of study in the major.

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. Use and care of compound and dissecting microscopes

Assignment:

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).
4. Laboratory and/or lecture homework assignments.
5. Objective examinations including: multiple choice and/or short essay lecture exams and short answer laboratory exams (4 midterms, 1 final).
6. Demonstrate basic microscope skills (microscope quiz).

Methods of Evaluation/Basis of Grade:

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

Written homework, lab reports or essays	Writing 5 - 10%

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

Genetic problems and data analysis	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, 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 and Materials:
Biology, Concepts and Connections, 6th edition. Campbell, Reece, Taylor, Simon, Dickey. Pearson Benjamin Cummings, 2007.
Concepts of Biology, 1st edition. Mader. McGraw-Hill, 2007.