General/Basic Info

#### **BIO 10 Course Outline as of Fall 2013**

# **CATALOG INFORMATION**

Dept and Nbr: BIO 10 Title: INTRO PRIN BIOLOGY

**Course Hours per Week** 

Lecture Scheduled

Non-contact DHR

Lab Scheduled

Contact DHR
Contact Total

Full Title: Introduction to Principles of Biology

Last Reviewed: 11/26/2012

4.00

4.00

Units

Maximum

Minimum



3.00

3.00

6.00

0

tes		
Nbr of Weeks	Course Hours Total	
17.5	Lecture Scheduled	52.50
8	Lab Scheduled	52.50
)	Contact DHR	0

105.00

0

Contact Total

Non-contact DHR

Title 5 Category: AA Degree Applicable		General/Basic Info		
	Grading:	Grade or P/NP		
	Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP ← General/Repeatabili		
	Also Listed As:			
	Formerly:	General/Basic	Info	porintian/Catalog
			<u>∠</u> Des	cription/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:** 

Student Prep

**Limits on Enrollment:** 

Description/Schedule

# **Schedule of Classes Information:**

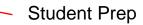
Description: Introductory course in biology including: scientific method, ecology, biodiversity, physiology and anatomy, chemistry of life, cell and molecular biology, genetics, and evolution.

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:



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: **Natural Sciences** Area: $\mathbf{C}$ **Transfer Area** CSU GE: Effective: Inactive: B2 Life Science Fall 1981 **B**3 Laboratory Activity **IGETC: Transfer Area** Effective: Inactive: 5B **Biological Sciences** Fall 1981 5C Fulfills Lab Requirement **CSU Transfer:** Transferable Effective: Fall 1981 Inactive: Articulation Module **UC Transfer:** Transferable Effective: Fall 1981 Inactive: CID:

Certificate/Major Applicable:  Both Certificate and Major Applicable  General/Basic Info				
Approval and Da	tes	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		

### COURSE CONTENT

Version Status Date:

Content/Outcomes and Objectives

Term Inactive:

Semester Last Taught:

Spring 2016

### **Student Learning Outcomes:**

Version Term Effective: Fall 2013

Upon successful completion of this course students will be able to:

11/26/2012

- 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:**

- 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), coevolution, 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

Content/Topics and Scope



- 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:

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

### Content/MOE

Lab reports or essay assignments

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

Homework assignments; laboratory exercises; genetics problems

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

Use and care of microscopes

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

Multiple choice, short answer and/or essay, lecture and lab exams (required)

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

Class participation

Writing 5 - 10%

Problem solving 2 - 10%

Skill Demonstrations 2 - 5%

Exams 65 - 80%

Other Category 0 - 10%

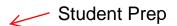
# **Representative Textbooks:**

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



# **OTHER REQUIRED ELEMENTS**



#### 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

02

NITS & REPEATABILITY

Lecture

General/Hours and

Units & Repeatability

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: Not in a repeat group

#### **SCHEDULING**

Method of instruction:

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

# General/ Scheduling

### **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