BIO 2.3 Course Outline as of Summer 2009

CATALOG INFORMATION

Dept and Nbr: BIO 2.3 Title: FUND BIO: BOTANY, ECO
Full Title: Fundamentals of Biology (Botany and Ecology)
Last Reviewed: 8/14/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	5.00	Lab Scheduled	6.00	8	Lab Scheduled	105.00
		Contact DHR	0		Contact DHR	0
		Contact Total	9.00		Contact Total	157.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 262.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	BIO 2B

Catalog Description:
Course covers the principles of ecology and the phylogeny of bacteria, protists, fungi and plants with emphasis on development, morphology, and physiology of higher plants. Field trips taken. Intended for students majoring in biological sciences, pre-medical, or related pre-professional programs. (Formerly BIO 1.2, BIO 2B)

Prerequisites/Corequisites:
Course Completion of BIO 2.1 (or BIO 3 or BIO 1.3 or BIO 1C)

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Course covers the principles of ecology and the phylogeny of bacteria, protists, fungi and plants with emphasis on development, morphology, and physiology of higher plants. Field trips taken. Intended for students majoring in biological sciences, pre-medical, or related pre-professional programs. (Formerly BIO 1.2, BIO 2A) (Grade Only)
Prerequisites/Corequisites: Course Completion of BIO 2.1 (or BIO 3 or BIO 1.3 or BIO 1C)

Recommended:
Limits on Enrollment:
Transfer Credit: CSU;UC. (CAN BIOL6)(BIO 2.3+BIO 2.2+BIO 2.1=BIOL SEQ A)
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:
CID Descriptor: BIOL 155 Botany / Plant Diversity and Ecology
SRJC Equivalent Course(s): BIO2.3

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Outcomes and Objectives:
Upon completion of the course, students will be able to:
1. Outline the classification system for major groups within the bacteria, algal protists, fungi and plants, and be able to correctly identify and classify selected example organisms.
2. Distinguish between various forms of bacterial photosynthesis and provide endosymbiotic evidence linking cyanobacterial photosynthesis to protists and plants.
3. Differentiate between types of Alternation of Generations patterns characteristic of protists, fungi and plants life cycles.
4. Identify major evolutionary structural and reproductive advances in plants.
5. Explain the phylogenetic relationships between major taxonomic groups and relate these links to evolutionary history.
6. Identify and explain the functions of the basic structures of organisms (emphasis on plants) and describe the complementary relationships between these structures and their functions.
7. Describe the physiological functions of plants in relationship to the natural habitats in which plants have evolved.
8. Explain the processes of life histories and development in plants from the embryo to the mature adult, including the influences of hormones and environmental factors.

9. Explain the principles of ecology, emphasizing populations, communities, and ecosystems.
10. Describe the consequences of human impacts of the global and local environment with an emphasis on conservation biology.

Topics and Scope:

I. Introduction
  A. Review of scientific method
  B. Principles of Biosystematics
  C. Classification of living things (using domains and kingdoms)
II. Cells
  A. Structure of the prokaryotic cell
  B. Eukaryotic cell structure and function, emphasizing the function of specialized plant organelles.
  C. Review of Cellular Reproduction: Mitosis and Meiosis
  D. Benefits of multicellularity.
  E. Representative life cycles including: sporic, gametic and zygotic meiosis.
II. Bacteria
  A. Bacterial diversity with emphasis on Cyanobacteria
  B. Origin of photosynthetic mechanisms emphasizing cyanobacteria and chlorophyll a
III. Protists and fungi
  A. Kingdom Protista Diversity
    1. Euglenoids
    2. Dinoflagellates
    3. Slime Molds
    4. Diatoms, Brown
    5. Water Molds
    6. Red and Green Algae
  B. Kingdom Fungi Diversity including Lichens and Mycorrhizaszas
IV. Plants
  A. Origin and Development of the Kingdom Plantae
  B. Diversity and evolutionary advances
    1. Bryophytes and seedless vascular plants
    2. The evolution of seed plants
    3. Gymnosperms nosperms
    4. Angiosperms
  C. Plant Structure and Function
    1. Tissues and tissue systems.
    2. Seed plant anatomy (stems, roots, leaves, flowers, and fruit)
    3. Primary and secondary growth
V. Plant physiology
  A. Water in living systems
    1. Diffusion
    2. Osmosis
    3. Water potential
  B. Active and Passive Transport in plants
    1. Transport of water
    2. Gas exchange and stomatal control mechanisms
    3. Transport of solutes in plants

C. Metabolism
1. Review respiration and energetics
2. Photosynthesis
3. Alternative photosynthetic pathways (C3, C4 and CAM) and photorespiration

D. Soils and mineral nutrition

E. Plant growth and development

F. Plant hormones and their functions

VI. Ecology

A. Dynamics of biological systems

B. Population biology
1. Structure
2. Demographics

C. Community dynamics
1. Structure and species interaction
2. Succession and disequilibrium models

D. Ecosystem
1. Energy flow and trophic structure
2. Water and nutrient cycling
3. Human impacts

E. Conservation Biology
1. Endangered species, invasive species
2. Habitat fragmentation
3. Genetic diversity, extinction

VII. Laboratory Exercises

A. Microscopy
1. Plant cells
2. Bacteria
3. Cell reproduction

B. Diversity: taxonomy and identification
1. Alga, fungi, protists
2. Seedless vascular plants
3. Gymnosperms
4. Angiosperms

C. Physiology
1. Plant transport
2. Osmosis and water potential
3. Mineral nutrition
4. Photosynthesis
5. Growth

D. Ecology
1. Perform field ecology sampling, such as vegetation analysis
2. Field trips to study local plant communities

Assignment:

1. Weekly reading in text and other sources, 30-60 pages per week.
2. Lab notebooks: notes and drawings from lab observations.
3. Lab reports: may include calculation, graphing and data analysis, 2-4 per semester.
4. Field trips

5. Formal assessment: 3 to 4 midterm exams and a comprehensive final exam including objective and essay questions, 3 to 4 lab practical examinations.

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.

Research Essay, Lab Notebook	Writing 20 - 40%

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

Lab reports	Problem solving 10 - 20%

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

None	Skill Demonstrations 0 - 0%

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

Multiple choice, Completion, Essay questions	Exams 40 - 70%

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

Active participation in class, including field trips	Other Category 0 - 10%

Representative Textbooks and Materials:
Biology: Campbell and Reece, 7th edition, 2005
Plant Biology: Rost, Barbour, Stocking and Murphy, 2nd ed, 2006
Photo Atlas For Botany: Perry and Morton, 1998