This course is designed to satisfy the major requirements for an Associate or Baccalaureate degree in the Biological Sciences. Biology G183 complements Biology G180 and G182 as the third of three in a sequence of survey courses. Topics include: fundamentals of chemistry and biochemistry; cytology, with an emphasis on plant cytology; fundamentals of biological energy: catalysis, cellular respiration and photosynthesis; Mendelian and molecular genetics; ethnobotany; evolution and speciation; plant, population, and community ecology; systematics and taxonomy, with light surveys of (taxonomic) Kingdoms Archaeabacteria, Eubacteria, Fungi, and Protista - emphasis is on Kingdom Plantae: plant histology, anatomy, physiology, morphology and diversity; and principles of plant culture (cultivation). ADVISORY: Biology G180

JUSTIFICATION FOR COURSE:

Align with C-ID descriptor 155

PREREQUISITES:

- GWC Math Placement Level of 50 or higher.
- MATH G030: Intermediate Algebra with a minimum grade of C or better
  or
- OCC Math Placement Level of 50 or higher.
  or
- MATH A030: Intermediate Algebra with a minimum grade of C or better
  or
- CCC Math Placement Level of 60 or higher.
  or
- MATH C030: Intermediate Algebra with a minimum grade of C or better
  or
- MATH G040: Accelerated Elementary and Intermediate Algebra with a minimum grade of C or better

COREQUISITES:

ADVISORIES:

- BIOL A180: Cell and Molecular Biology

ASSIGNED DISCIPLINES:

- Biological sciences

MATERIAL FEE: Yes [X] No [ ] Amount: $4.00

CREDIT STATUS: Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]

GRADING POLICY: Pass/No Pass [ ] Standard Letter [X] Not Graded [ ] Satisfactory Progress [ ]
OPEN ENTRY/OPEN EXIT: Yes [ ] No [X]
TRANSFER STATUS: CSU Transferable[ ] UC/CSU Transferable[X] Not Transferable[ ]
BASIC SKILLS STATUS: Yes [ ] No [X] LEVELS BELOW TRANSFER: Not Applicable
CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable
NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course
OCCUPATIONAL (SAM) CODE: E
REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [ ] NUMBER REPEATS:
REQUIRED FOR DEGREE OR CERTIFICATE: No [ ] Yes [X]
General Biology(Associate in Arts)
Liberal Arts: Emphasis in Science(Associate in Arts)
GE AND TRANSFER REQUIREMENTS MET:
IGETC Area 5: Physical and Biological Sciences
   5B: Biological Science
   x
   x
CSU GE Area B: Scientific Inquiry and Quantitative Reasoning
   B2 - Life Science
   B3 - Laboratory Sciences

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Describe the organization and interactions of organisms within selected populations and communities.
2. Construct and correctly interpret phylogenies.
3. Describe major metabolic processes of botanical organisms such as cellular transport, photosynthesis, biosynthesis, digestion, cellular respiration, reproduction growth and development.
4. Identify phylogenic characteristics of plants, fungi, and photosynthetic protistans.
5. Describe the life cycles of major plant, fungi, and photosynthetic protistan taxa.

COURSE OBJECTIVES:
1. Recognize characteristics of plants, fungi, and photosynthetic protistans and their phylogenetic relationship.
2. Describe major metabolic processes of botanical organisms such as cellular transport, photosynthesis, biosynthesis, digestion, cellular respiration, reproduction growth and development.
3. Construct and interpret phylogenies.
4. Describe the structural organization of plants, fungi, and photosynthetic protistans.
5. Describe various ecosystem processes such as energy flow and nutrient cycling.
6. Describe the organization and interactions of organisms within selected populations and communities.
7. Demonstrate a clear understanding of the process of natural selection, genetics and evolution at the molecular, cellular and community interactions level.
8. Apply scientific methodology and reasoning regarding experimental design, data collection, interpretation and the application of logic to develop, support, or derive general scientific principles from empirical data.

COURSE CONTENT:
LECTURE CONTENT:

1. Origins of life
   - Evolutionary history, placement, and taxonomic characterization of:
     1. Plants
     2. Fungi
     3. Photosynthetic protists

2. Introduction to botany and the plant body
   A. Anatomy (structure)
     1. Cells
     2. Tissues
     3. Organs
   B. Physiology (function)
     1. Life cycles
     2. C3, C4, and CAM photosynthesis
     3. Plant development
        - Reproduction, hormones, and regulation

3. Introductory Molecular Biology/ Biochemistry
   A. DNA replication
   B. Gene expression (transcription)
   C. Protein synthesis
   D. Mendelian genetics
   E. Molecular genetics

4. Microscopy
   - Cytology
     1. Evolutionary theory of molecular dynamics structure
     2. Organelle function
     3. Cellular energetics
        - Photosynthesis
        - Respiration
        - Water potential
        - Catalysis
4. Cell cycle
   - Mitosis
   - Meiosis

5. Taxonomy and Systematics
   A. Plant speciation
   B. Classification schemes

6. Ecology
   A. Population ecology
      1. Population structure, growth, regulation and fluctuation
      2. Intraspecific interactions
   B. Community ecology
      1. Community structure and succession
      2. Interspecific interactions
         - Symbiosis
            - Mutualism
            - Commensalism
            - Predation
            - Competition
            - Parasitism
   C. Ecosystem ecology
      1. Ecosystem structure
         - Trophic levels
         - Energy flow
         - Nutrient cycling
      2. Ecosystem diversity
         - Biomes

7. Ethnobotany
LABORATORY CONTENT:
1. Exercises in field biology
   A. Plant identification
   B. Plant collection
   C. Plant preservation
   D. Plant utility
2. Comparative studies of plants, fungi and photosynthetic protistans
   A. Microscopy
   B. Histology
   C. Development
   D. Physiology
   E. Adaptations
   F. Culture (cultivation)
3. Evolution and speciation mechanisms
4. Classification schemes and tools
   A. Generating phylogenetic tree
   B. Classifying using a phylogenetic tree
5. Measures of species diversity and richness
6. Population and field ecology

A. Population growth modeling

B. Field observations

7. Statistical analysis of collected data

METHODS OF INSTRUCTION:

A. Lecture:
B. Lab:
C. Field Experience:
D. Independent Study:

INSTRUCTIONAL TECHNIQUES:

COURSE ASSIGNMENTS:

Reading Assignments

Textbook

Out-of-class Assignments

1. Laboratory investigations.
2. Field trip(s).
3. Literature research/independent research assignments
4. Oral presentation

Writing Assignments

1. Weekly or biweekly data collection, analysis, and interpretation.
2. Demonstrate proficiency with scientific writing style and format in weekly reports, quizzes, and midterms.
3. Show evidence of higher levels of cognizance and problem solving skills in real or hypothetical research scenarios.
4. Demonstrate competence with scientific apparati - utility and application.

METHODS OF STUDENT EVALUATION:

Midterm Exam
Final Exam
Short Quizzes
Written Assignments
Essay Examinations
Report
Projects (ind/group)
Problem Solving Exercises
Oral Presentations
Skills Demonstration

Demonstration of Critical Thinking:

Weekly laboratory exercises include short answer assignments, field and lab research, data collection and analysis. Two local field trips provide opportunities to assess field botany and scientific data collection and writing skills. An independent research project provides an opportunity to assess competence in literature research, presentation media technology, presentation delivery skills and peer review.
Required Writing, Problem Solving, Skills Demonstration:

1. Weekly or biweekly data collection, analysis, and interpretation.
2. Demonstrate proficiency with scientific writing style and format in weekly reports, quizzes, and midterms.
3. Show evidence of higher levels of cognizance and problem solving skills in real or hypothetical research scenarios.
4. Demonstrate competence with scientific apparati - utility and application.

TEXTS, READINGS, AND RESOURCES:

TextBooks:


LIBRARY:

Adequate library resources include:

Comments:

Attachments:

Attached Files