GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: BIO 2 DIVISION: 10 ALSO LISTED AS:

TERM EFFECTIVE: Spring 2023 CURRICULUM APPROVAL DATE: 05/10/2022

SHORT TITLE: ORGANISMAL BIOLOGY

LONG TITLE: Organismal Biology

Units	Number of Weeks	Type	Contact Hours/Week	Total Contact Hours
5	18	Lecture:	3	54
		Lab:	6	108
		Other:	0	0
		Total:	9	162

Out of Class Hrs:	108.00
Total Learning Hrs:	270.00

COURSE DESCRIPTION:

This course is the second in a two-semester sequence exploring the basic biology and diversity of unicellular and multicellular organisms. Topics include general biological principles, ecology, classification, structure, function and evolutionary adaptations of organisms (including plants, fungi, animals, and unicellular organisms) to their environments. (C-ID: BIOL 140) PREREQUISITE: BIO 1 with a grade of 'C' or better, and MATH 240 or Intermediate Algebra or equivalent with a grade of 'C' or better. High school-level reading and writing skills are strongly recommended.

PREREQUISITES:
BIO 1 with a grade of 'C' or better, and MATH 240 or Intermediate Algebra or equivalent with a grade of 'C' or better.

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES
L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion
03 - Lecture/Laboratory
04 - Laboratory/Studio/Activity
04B - Laboratory - LEH 0.75
05 - Hybrid
71 - Dist. Ed Internet Simultaneous
72 - Dist. Ed Internet Delayed
73 - Dist. Ed Internet Delayed LAB
73B - Dist. Ed Internet LAB-LEH 0.75

STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Apply the processes of scientific inquiry, phylogenetic analysis, and experimental design to the diversity of organisms.
2. Describe the molecular and structural unity of life, explain how the diversity of living things is generated and perpetuated, and exemplify this diversity among and within life's three domains.
3. Demonstrate the fundamental processes underlying adaptive evolution, speciation and extinction, population growth and regulation, species coexistence, and maintenance of biodiversity.
4. Demonstrate the ability to design and execute collection, evaluation and interpretation of scientific data.
5. Address scientific questions using quantitative approaches and critical reasoning, including developing hypotheses, analyzing data, and interpreting results.
6. Demonstrate scientific literacy and skill in communication of evolutionary and ecological concepts, data, and interpretation using multiple formats appropriate for target audiences, including non-scientists.
7. Critically evaluate scientific information from a variety of sources.

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Describe various organismic classifications and their phylogenetic relationships.
2. Explain the process of Darwinian evolution, including the origins of Darwinian evolution.
3. Discuss evolutionary theory, including mechanisms of diversification of life and evidence for evolution.
4. Describe the factors that influence population genetics and how they relate to evolution of populations.
5. List and describe the signs of evolution including biogeography, the fossil record, comparative anatomy, comparative embryology, and molecular biology.
6. Explain the physiology of plants and animals and how homeostasis is maintained.
7. List and describe the major factors that influence macroevolution.
8. Explain how prezygotic and postzygotic reproductive barriers influence speciation.
9. Evaluate the relationships of organisms to each other and their environments.
10. Explain the major concepts of population dynamics.
11. Describe the concepts in community ecology.
12. Evaluate the adaptive nature of organismal systems to various environments and understand the ecological role of several taxa.
13. Describe the body systems, anatomy and functional physiology of several taxa.
14. Explain how protozoan, fungi, plants and animal life originated and evolved.

COURSE CONTENT:

Curriculum Approval Date: 05/10/2022

LECTURE CONTENT:

Major Topics

1. Evolutionary theory, including mechanisms of diversification of life and evidence for evolution
2. Phylogeny of life on earth (including plants, fungi, animals, and unicellular organisms)
3. Anatomy, physiology, organismal life cycles and development of living organisms
4. Interaction of organisms with the environment
5. Scientific method and inquiry
6. Current taxonomic organization
7. Basic ecological principles
8. Characteristics of major marine and terrestrial ecosystems
9. Restoration ecology
10. Population genetics
11. Microevolution and macroevolution

1.5 LEC HOURS

Scientific method and inquiry

Lecture Objectives:

1. Discuss the scientific method.
2. Describe the properties of life.
3. Discuss the impact of humans on the environment.
4. Describe the attributes of living things.
5. Define and discuss basic principles of organic and biochemistry.
6. List and describe the organic and inorganic molecules found in life, including proteins, carbohydrates, lipids, and nucleic acids.
7. Discuss the importance of acids, bases, and buffers.

3 LEC HOURS

Lecture Objectives:

1. Describe the origins of life, and the first organisms on earth.
2. Define natural selection.
3. Compare Darwin's concept of descent with modification to the prevailing ideas of his time.
4. Explain how, over time, natural selection results in organisms' adaptation to their environment.
5. Describe the mechanisms of evolutionary change including micro-evolutionary forces that determine patterns of genetic diversity within species (Speciation) and macro-evolution.
6. Use examples to show how evolution is supported by scientific evidence.
7. Evaluate the evidence of evolution.
8. Describe the Evolution of Populations
9. Describe Adaptive and Non-Adaptive Evolution

1.5 LEC HOURS

Lecture Objectives:

1. Explain cell structure and function, Define prokaryotic and eukaryotic organisms, and compare the two.
2. Describe the cell life cycle, interphase, mitosis, meiosis.
3. Describe the three general types of life cycle: zygotic, gametic, and sporic.
4. Describe how organisms maintain homeostasis: water and ion balance, gas exchange, energy and nutrient acquisition, temperature regulation.

COURSE CONTENT(CONTINUED):

LECTURE CONTENT(CONTINUED):

1.5 LEC HOURS

Lecture Objectives:

1. Define systematics and taxonomy.
2. Define the term species.
3. Construct an evolutionary tree.
4. Describe how cladograms are used in the classification system.
5. List and describe the 3 Domains of life and the major Kingdoms.

1.5 LEC HOURS

Lecture Objectives:

1. Describe the importance of plants to all life forms.
2. Discuss the different forms of energy and the laws or thermodynamics.
3. Discuss the history of the development of cell theory.
4. List and describe plant cell organelles.
5. Discuss how communication occurs between plant cells.
6. Describe the plant cell cycle and the phases of mitosis.
7. Discuss the chemical composition and functions of DNA.

1.5 LEC HOURS

Lecture Objectives:

1. Define the term meristem and list and identify the locations of meristematic tissue in plants.
2. Describe the epidermis, periderm, and secretory tissues of plants.
3. List and describe the basic functions and forms of roots, including the pericycle and endodermis.
4. List, compare and contrast the different types of specialized roots.
5. Describe the materials that comprise soil.
6. Describe the horizons of a soil profile.
7. Describe the process of soil development.
8. List and describe the different factors that contribute to a productive agricultural soil.
9. Discuss the movement of water within soils, and water availability.
10. Discuss the relationship between pH, nutrient availability, and plant growth.

2 LEC HOURS

Lecture Objectives:

1. List and describe specialized stems, including stolons, rhizomes, tibers, corms, bulbs, cladophylls, and tendrils.
2. Describe the tissues that develop from the shoot apices and the meristems from which each tissue develops.
3. Compare and contrast the stems of herbaceous and woody dicots with the stems of monocots.
4. Describe the composition and structure of wood.
5. Describe the structure of a typical leaf and relate the structure to the functions of a leaf.
6. Discuss the attachment, arrangement, and venation of leaves. Compare and contrast monocot and dicot leaves.
7. Describe simple versus compound leaves and the different types of compound leaves.
8. Discuss the structure and importance of stomata.
9. Discuss the changes in leaves that occur in response to changes in the environment, including abscission and pigment changes.

COURSE CONTENT(CONTINUED):

LECTURE CONTENT(CONTINUED):

3 LEC HOURS

Lecture Objectives:

1. Describe the structures of a typical flower.
2. Compare and contrast monocot and dicot flowers.
3. Define and discuss the terms annual, biennial, perennial.
4. Discuss the development and basic structure of fruits.
5. Discuss various mechanisms of seed dispersal.
6. Describe the structures of a seed and their functions.
7. Discuss the process of and the requirements for germination.
8. Discuss factors that affect seed viability and the length of time that various seeds may remain viable.
9. Define and discuss: diffusion, osmosis, turgor, imbibition, plasmolysis, active transport.
10. Discuss the cohesion-tension theory and the pressure-flow hypothesis and their relationship to the movement of water in plants.

3 LEC HOURS

Lecture Objectives:

1. List the reactants and products for the general equations for photosynthesis and respiration.
2. Discuss the relationship between photosynthesis and respiration.
3. Discuss oxidation-reduction reactions and their roles in photosynthesis and respiration.
4. Compare and contrast light-dependent and light-independent reactions of photosynthesis.
5. List and discuss the roles of other plant pigments.
6. Discuss how light energy is transformed into chemical energy through the reactions of photosynthesis.
7. Describe the roles of the NADPH and ATP in photosynthesis.
8. Discuss the relationship between photosystem I and photosystem II.
9. Discuss photolysis and photophosphorylation. Compare and contrast cyclic and non-cyclic photophosphorylation.
10. Discuss how the chemiosmotic theory explains both the synthesis of ATP in photosynthesis and in oxidative phosphorylation.
11. Compare and contrast the C3, C4 and CAM pathways of photosynthesis.
12. List the major reactants, and products of glycolysis, the Krebs cycle, and respiration.
13. Define, compare and contrast the processes of fermentation and anaerobic respiration.
14. Define and discuss assimilation and digestion in plants.

2 LEC HOURS

Lecture Objectives:

1. Define the terms growth and development.
2. Compare and contrast hormones, enzymes, and vitamins.
3. Discuss the roles of auxins, gibberellins, and cytokinins in plant growth.
4. Discuss how plant growth hormones are used commercially.
5. Define and discuss senescence and apical dominance.
6. Discuss circadian rhythms in plants.
7. Describe the movements that occur in slime molds, cyanobacteria, and some protists.
8. Define photoperiodism, thermoperiodism.
9. Discuss phytochromes, cryptochromes and their roles.
10. Discuss dormancy, quiescence and the factors that may affect germination.

COURSE CONTENT(CONTINUED):

LECTURE CONTENT(CONTINUED):

3 LEC HOURS

Lecture Objectives:

1. List the six species of plants that provide most of the human caloric needs.

2. Describe how human selection has changed changes in plant population phenotypes.

3. Describe and discuss recombinant DNA techniques used for sexually incompatible germplasm, including gene splicing, gene synthesizing, use of plasmids, and transformation.

4. Discuss the pros and cons of the use of transgenic plants.

5. Describe techniques used in seed propagation and storage.

6. Discuss the evidence for evolution.

7. Discuss the significance of natural selection, mutation, migration and genetic drift to the process of evolution.

8. Differentiate between microevolution and macroevolution.

9. Describe how reproductive, geographic, ecological, mechanical and other types of isolation contribute to the evolution of species.

10. Discuss the reasons for the continuing controversy over evolutionary theory.

1.5 LEC HOURS

Lecture Objectives:

1. Discuss the value of scientific nomenclature, how it was developed, and how it currently used.

2. Discuss the development of the kingdom concept of classification, and the six kingdom system classification currently in common use.

3. List the different groups used in the taxonomical hierarchy.

4. Discuss the use of cladistics to establish natural relationships.

5. Discuss why it is difficult to classify prokaryotes, and list and describe criteria used to classify and identify prokaryotes.

1.5 LEC HOURS

Lecture Objectives:

1. Discuss how bacteria are useful to humans.

2. Discuss how bacteria and viruses are harmful to humans.

3. Describe the cyanobacteria and differentiate them from the true bacteria.

4. Describe the kingdom archaea, and discuss roles of members of this kingdom in human existence.

1.5 LEC HOURS

Lecture Objectives:

1. Describe the major characteristics of and important members of major phyla of protists and other organisms.

1.5 LEC HOURS

Lecture Objectives:

1. List the characteristics of members of the Kingdom Fungi.

2. Distinguish the phyla and subphyla of fungi based on their cell structure, type of hypha, and type of reproduction.

3. Discuss the major phyla and subphyla and their relevance to human existence.

1.5 LEC HOURS

Lecture Objectives:

1. Compare and contrast the Plant Kingdom with other kingdoms.

2. Discuss reproduction and life cycles of liverworts, hornworts, and mosses.

4. Describe the seedless vascular plants: whisk ferns, club mosses and quillworts, horsetails and scouring rushes, and ferns.

5. Discuss the human relevance of the seedless vascular plants.

COURSE CONTENT(CONTINUED):

LECTURE CONTENT(CONTINUED):

1.5 LEC HOURS

Lecture Objectives:

1. Discuss the evolutionary relationships between the different groups of plants,including bryophytes, seedless vascular plants, gymnosperms, and angiosperms.
2. Discuss the evolution of seed plants.
3. Differentiate between the major gymnosperm phyla.
4. Describe reproduction and life cycles in gymnosperms.

1.5 LEC HOURS

Lecture Objectives:

1. Discuss the evolution of the angiosperms.
2. Compare and contrast the gymnosperms and angiosperms.
3. Describe the life cycle of the flowering plant.
4. Compare and contrast the development of the two types of female gametophytes and the male gametophyte.
5. Relate flower characteristics and pollinators to their evolution and ecology.
6. Discuss the origin of cultivated plants.

1.5 LEC HOURS

Lecture Objectives:

1. Describe the characteristics of the protozoan.
2. Describe the meaning of the term metazoan, and list the three categories of metazoans.
3. Describe features of the Phylum Placozoa, Mesozoa, Porifera, and Cnidaria.
4. Define radial symmetry.
5. Describe what is meant by the term diploblastic.

1.5 LEC HOURS

Lecture Objectives:

1. Define the term acoelomate, bilateral animals and describe features of such animals.
2. List the phyla that are acoelomate, bilateral animals.
3. List and describe the structures and their functions of various organisms in Phylum Platyhelminthes.
4. Describe the process of nutrition and digestion that occurs in platyhelminths.
5. Describe the organ systems present and absent in platyhelminths.
6. Describe the different classes of platyhelminths and compare to phyla covered to date.

1.5 LEC HOURS

Lecture Objectives:

1. Describe characteristics of pseudocoelomate animals
2. Name the phyla that are pseudocoelomates.
3. Describe the major structures and characteristics of Phyla Nematoda, and Rotifera.

1.5 LEC HOURS

Lecture Objectives:

1. Describe the characteristics of Annelida and list their functions.
2. Describe the different classes of Annelida.
3. Describe the characteristics of molluscs and list their functions.
4. Describe the different classes of molluscs.
5. List specific organisms that belong to the different classes of molluscs.

COURSE CONTENT(CONTINUED):

LECTURE CONTENT(CONTINUED):

1.5 LEC HOURS

Lecture Objectives:

1. Describe Subphyum Chelicerata, listing different structures found in these types of animals, and name the function of the structures.

2. Describe the aquatic and terrestrial mandibulates.

3. Describe organisms that belong to the different classes of Subphylum Uniramia.

4. Name beneficial and harmful insects and elaborate on their effects on the lives of humans.

5. Describe features of the Phylum Echinodermata.

6. Describe the different classes of echinoderms, and compare them.

1.5 LEC HOURS

Lecture Objectives:

1. Describe the features of Phylum Chordate and compare these features to those of the previously described phyla.

2. List and describe the structures and their functions of sharks, and fresh water fish.

3. Describe features of Subphylum Vertebrata, and compare them to those of previously described phyla.

4. Describe the different categories of vertebrates.

1.5 LEC HOURS

Lecture Objectives:

1. List and describe the structures and their functions of cartilaginous and bony fish, fresh and salt water fish.

2. List and describe the structures and their functions of amphibians, reptiles and aves.

3. List and describe the structures and their functions of mammals.

4. Compare and contrast the role of environmental changes and animal communication in triggering animal behavior.

5. Discuss how foraging and reproductive behavior can evolve as responses to selection for relative fitness.

6. Explain how genetic and quantitative analyses are used in exploring and modeling selection for particular behaviors.

1.5 LEC HOURS

Principles and Practice

Lecture Objectives:

1. Describe key factors that affect Earth's climate and explain how they influence climate patterns at different scales.

2. Identify terrestrial biomes and how their location and characteristics are influenced by climate and disturbance.

3. Identify the dominant zones and biomes in aquatic systems and their principal biological attributes.

4. Explain how the distribution of species is limited by biotic and abiotic factors.

5. Describe how ecological change and evolution affect one another over short and long periods of time.

1.5 LEC HOURS

Population Ecology

Lecture Objectives:

1. Define a population and three characteristics of populations: density, dispersion, and demographics.

2. Describe the exponential model of population growth and its key assumptions.

3. Contrast the logistic and exponential models of population growth and define population carrying capacity.

4. Define life history and explain how life history traits are products of natural selection.

5. Contrast how density-dependent and density-independent factors affect population growth.

6. Describe the historical and recent growth of the human population.

COURSE CONTENT(CONTINUED):

LECTURE CONTENT(CONTINUED):

1.5 LEC HOURS

Community Ecology

Lecture Objectives:

1. Define a community and the main types of interspecific interactions.
2. Characterize the key components of species diversity and trophic structure in biological communities.
3. Describe the roles of disturbance and ecological succession in affecting species diversity and composition.
4. Describe the biogeographic influences of latitude and area on community diversity.
5. Define pathogens and explain how they influence biological communities.

1.5 LEC HOURS

Ecosystems and Restoration Ecology

Lecture Objectives:

1. Describe how the conservation of energy and mass are useful in ecosystem ecology.
2. Contrast three types of production in ecosystems and the importance of energy inputs for them.
3. Describe the efficiency of energy transfer in ecosystems.
4. Define the key components of biogeochemical cycles.
5. Describe the main approaches used in ecological restoration.

1.5 LEC HOURS

Ecology and Conservation Ecology

Lecture Objectives:

1. Identify three kinds of biodiversity and the major threats to them.
2. Describe the different ways that population size and genetic diversity influence the health of populations.
3. Explain the major approaches of habitat conservation that help sustain biodiversity.
4. Describe types of environmental change arising from human activities.
5. Define sustainability and its relevance for maintaining biodiversity and human well-being.

2 LEC HOURS

Final Exam

COURSE CONTENT(CONTINUED):

LAB CONTENT:

Major Topics

1. Microscopic, gross comparative anatomy, and dissection of organisms from representative phyla
2. Observations of the functional morphology of representative phyla
3. Observations of the physiology of representative phyla
4. Study of the developmental stages of representative phyla
5. Use of analog and digital simulations to study natural selection, speciation and population genetics
6. Survey of biodiversity, from Prokaryotes to Chordates, Natural Selection, Evolution and Population Genetics
7. Taxonomy and Systematics
8. Introduction to experimental design and statistical analysis
9. Introduction to the use of field equipment used in sampling and environmental monitoring
10. Ecological field excursions to local ecosystems, rocky and sandy intertidal communities and near coastal marine mammal habitat, coastal redwoods, woodland forest, grassland, chapparal, foothills, riparian, wetlands
11. Independent field projects: Design and planning, data collection and analysis, and formal presentations

3 LAB HOURS

Lab Objectives:

1. Describe safety procedures in the lab.
2. Demonstrate the correct handling and usage of a compound microscope and dissecting microscope.
3. Identify the various structures and organelles of the eukaryotic cell as seen through the microscope.

3 LAB HOURS

Lab Objectives:

1. Appraise the process of Natural Selection using model organisms
2. Evaluate Natural Selection, the variation in the expression of genetic information that leads to difference in performance among individuals.

1.5 LAB HOURS

Lab Objectives:

1. Discuss correct drawing techniques for lab reports.
2. Describe general practices to be used in the lab.
3. Identify components of plant cells that can be observed using the light microscope.
4. Compare and contrast cyclosis (cytoplasmic streaming) and independent cellular motility.
5. Describe and identify the events of the phases of mitosis.
6. Discuss the structure and function of structures associated with mitosis.

1.5 LAB HOURS

Lab Objectives:

1. Describe and identify the phases of meiosis.
2. Discuss and identify gametophyte and sporophyte phases of plant life cycles.
3. Identify tissues as haploid or diploid.
4. Perform and discuss basic techniques of plant propagation using stems, roots and leaves.
5. Perform and discuss bud grafting.
6. Perform and discuss propagation of seed embryos on artificial media.
7. Discuss the importance of sterile techniques in plant propagation in sterile media.

3 LAB HOURS

Lab Objectives:

1. Evaluate the ecological relationships of organisms at the population, community, and ecosystem level.
2. List and describe the structures and their functions of various protozoans.

COURSE CONTENT(CONTINUED):

LAB CONTENT(CONTINUED):

6 LAB HOURS

Lab Objectives:

1. List and describe the functions of various structures of organisms in Phylum Porifera.
2. List and describe the structures and their functions of various organisms in Phylum Cnidaria.
3. Perform dissections.

6 LAB HOURS

Lab Objectives:

1. List and describe the functions of various structures of organisms in Phylum Platyhelminthes.
2. List and describe the structures and their functions of various organisms in Phylum Nematoda.
3. Perform dissections.

2 LAB HOURS

Lab Objectives:

1. Complete a lab practical exam.

6 LAB HOURS

Lab Objectives:

1. List and describe the functions of various structures of organisms in Phylum Annelida.
2. List and describe the structures and their functions of various organisms in Phylum Mollusca.
3. Perform dissections.

9 LAB HOURS

Lab Objectives:

1. List and describe the functions of various structures of organisms in Phylum Arthropoda.
2. List and describe the structures and their functions of various organisms in Phylum Echinodermata.
3. List and describe the structures found in various organisms that are urochordates and cephalochordates.
4. Describe the functions of such structures and compare these 2 groups to the phyla previously described.
5. Perform dissections.

6 LAB HOURS

Lab Objectives:

1. List and describe the functions of various structures of sharks and fresh water fish.
2. List and describe the structures and their functions of amphibians.
3. Perform dissections.

6 LAB HOURS

Lab Objectives:

1. Identify plant cells in the different phases of meiosis.
2. Compare and contrast the processes of mitosis and meiosis.
3. Define the terms sporophyte and gametophyte, and relate these terms to the process of sexual reproduction in plants.
4. Compare life cycles in plants to life cycles in animals.
5. Observe plants in their natural setting.
6. Identify adaptations of chapparal plants to a Mediterranean climate

COURSE CONTENT(CONTINUED):

LAB CONTENT(CONTINUED):

6 LAB HOURS

Lab Objectives:

1. Observe examples of members of the different taxonomic groupings discussed in the lecture.
2. Define the terms gram positive and Gram negative.
3. Identify select structures of various cyanobacteria
4. Identify select structures of various protists.
5. Observe various examples of fungi.
6. Identify various reproductive structures of fungi.

3 LAB HOURS

Lab Objectives:

1. Observe examples of bryophytes and ferns.
2. Describe the life cycles of liverworts, mosses, and ferns.

3 LAB HOURS

Lab Objectives:

1. Observe examples of selected gymnosperms.
2. Compare and contrast selected gymnosperm leaves.
3. Discuss the life cycle of a gymnosperm.
4. Differentiate between male and female pine cones.
5. Identify various structures of pine cones, pine seeds, and pine pollen grains.
6. Distinguish between pines, cycads, and other gymnosperms.

3 LAB HOURS

Lab Objectives:

1. Identify the parts of a complete flower.
2. Discuss variations in ovary position and structure.
3. Describe the life cycle of a flowering plant.

3 LAB HOURS

Lab Objectives:

1. List and describe the parts of a woody stem during its winter condition.
2. In various stems, identify and discuss the function of: cork, cork cambium, epidermis, phelloderm, cortex, primary phloem, secondary phloem, vacular cambium, primary xylem, secondary xylem, broad and narrow phloem rays, broad and narrow xylem rays, tracheids, vessels, annual xylem rings, pith.
3. Compare and contrast monocot and dicot stems.

3 LAB HOURS

Lab Objectives:

1. Identify simple versus compound leaves.
2. Identify the parts of a compound leaf.
3. Identify various structures of leaves, including: upper epidermis, lower epidermis, guard cells, veins, palisade mesophyll, spongy mesophyll, stomata.
4. Compare and contrast leaves of conifers and flowering plants.
5. Compare and contrast leaves of monocots and dicots.

3 LAB HOURS

Lab Objectives:

1. Perform and discuss basic techniques of plant propagation using stems, roots, and leaves.
2. Perform and discuss bud grafting.
3. Perform and discuss propagation of seed embryos on artificial media.

COURSE CONTENT(CONTINUED):

LAB CONTENT(CONTINUED):

2 LAB HOURS

Lab Objectives:

1. Prepare a lab report using correct formal English and scientific format.

2. Define and incorporate appropriately in a paper the terms hypothesis and control.

6 LAB HOURS

Lab Objectives:

1. Describe and discuss the effects of auxins and gibberellins on stem growth.

2. Describe phototropism and gravitropism and discuss their causes.

3. Describe etiolation and its causes.

4. Describe and discuss the effects of ethylene on abscission.

3 LAB HOURS

Lab Objectives:

1. Describe techniques for the demonstration of starch in plants. Discuss the relationship between starch and photosynthesis.

2. Discuss the relationship between chlorophyll and photosynthesis.

3. Describe techniques for the solvent extraction of plant pigments.

4. Describe the technique of paper chromatography and how it can be used to demonstrate plant pigments.

5. Define the term fluorescence and demonstrate fluorescence in photosynthetic pigments.

6. Discuss the use of phenol red a pH indicator.

7. Discuss the formation of acid from carbon dioxide and water, and this reaction can be used to demonstrate the use of carbon dioxide in photosynthesis.

3 LAB HOURS

Lab Objectives:

Community Ecology

1. Describe the processes of primary succession and secondary succession

2. Explain why disturbances play an important role in the progression of succession

3. Define a climax community

4. Describe why most areas will not make it to a climax community

5. Describe the plant communities present after glacial succession and how they change the environment

3 LAB HOURS

Lab Objectives:

Ecosystem Ecology

1. Define Ecology, population, community, and ecosystem.

2. Differentiate between producer, consumer, herbivore, carnivore, omnivore, parasite, decomposer, and detritivore.

3. Assign organisms to their trophic level and construct a food web.

4. Explain what makes a community and an ecosystem different

5. Describe the differences between abiotic and biotic factors

9 LAB HOURS

Lab Objectives:

Field Projects - Data Collection and Data Analysis

1. Collect, pin, and identify some common insects.

2. Effectively use field guides and technical manuals (dichotomous keys) to identify specimens of common plants and animals.

COURSE CONTENT(CONTINUED):
LAB CONTENT(CONTINUED):
3 LAB HOURS
Lab Objectives:
1. Student Presentation
2 LAB HOURS
Lab Objectives:
1. Complete a lab practical exam.

METHODS OF INSTRUCTION:
Lecture and laboratory, with use of computer animations, video, PowerPoint presentations, and the Internet.

OUT OF CLASS ASSIGNMENTS:
Required Outside Hours 60
Assignment Description
Homework, genetics problems, field projects (data collection and analysis)

Required Outside Hours 48
Assignment Description
Lab reports

METHODS OF EVALUATION:
Objective examinations
Evaluation Percent 68
Evaluation Description
Percentage range 60-80%; Multiple Choice, True/False, Fill-In, Free Response

Problem-solving assignments
Evaluation Percent 15
Evaluation Description
Percentage range 15-20%; Lab Reports, Quizzes

Writing assignments
Evaluation Percent 15
Evaluation Description
Percent range 15-20%; Lab Reports, Papers

Skill demonstrations
Evaluation Percent 2
Evaluation Description
Percent range 2-5%; Class performance, Field work, Exams, Use of lab equipment (e.g. microscope)

REPRESENTATIVE TEXTBOOKS:

Campbell Biology, Lisa A. Urry, Michael L. Cain, Steven A. Wasserman, Pearson, 2021.

ISBN: 9780135188743

Rationale: Campbell Biology is the standard-bearer for introductory college-level biology for majors.

17 Grade Verified by: D. Young

Investigating Biology Laboratory Manual, Judith Giles Morgan Lisa A. Urry M Eloise Brown Carter Michael L. Cain Steven A. Wasserman Peter V. Minorsky Jane B. Reece, Pearson, 2017.

ISBN: 9780134473468

Rationale: Investigation Biology Laboratory Manual presents the fundamentals of biology such as the following: the scientific method, microscopy, diffusion, osmosis, metabolism, photosynthesis, mitosis, meiosis, mendelian genetics, population genetics, evolution, bacteriology, protist, plant diversity, bioinformatics, phylogenetics, The Kingdom Fungi, animal diversity, plant anatomy, plant growth, animal anatomy, animal physiology, animal development, ecology

17 Grade Verified by: D. Young

Required Other Texts and Materials

Life: the science of biology 11th edition, by Sadava, Hillis, Heller, and Hacker (ISBN 9781319010164)

ARTICULATION and CERTIFICATE INFORMATION

GAV GE:
- GAV B2
- GAV B3
- GAV Area 5

CSU GE:
- CSU B2
- CSU B3

IGETC:
- IGETC 5B
- IGETC 5C

CALGETC:
- CALGETC Area 5B
- CALGETC Area 5C

CSU TRANSFER:
- Transferable CSU

UC TRANSFER:
- Transferable UC

SUPPLEMENTAL DATA:

Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education: N
Program Status: 1 Program Applicable
Special Class Status: N
C-ID: (BIOL 140)
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Course Control Number: CCC000603154
Sports/Physical Education Course: N
Taxonomy of Program: 040100