SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

HSDP 511

COURSE TITLE

BIOLOGY 1

TYPE COURSE

NON FEE BASIC SKILLS

CATALOG COURSE DESCRIPTION

This is the first course of a two course Biology series. Students will be introduced to biology and use experimentation and inquiry to explore the basic concepts of biological science. Cellular structure, function and structure of plants and animals, genetics, evolution, and ecological relationships will be covered. The laboratory component is online using virtual software. (FT)

LECTURE/LABORATORY HOURS

90

ADVISORIES

NONE

RECOMMENDED SKILL LEVEL

NONE

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
   SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication
   SDCE students demonstrate effective communication skills.
3. Critical Thinking
   SDCE students critically process information, make decisions, and solve problems independently or cooperatively.

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

4. Personal and Professional Development
   SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self-advocacy skills to cope with changing situations in their lives.

COURSE GOALS

1. Students will learn how to evaluate and explain the basic concepts of biological science and describe and analyze the steps of the scientific methods as they relate to biology and biology laboratories.
2. Students will understand the concepts of the different biological systems, and be able to compare and contrast these concepts.
3. Students will learn how to analyze and evaluate a chart, graph, or data table and answer questions based upon their understanding of biology.
4. Students will learn how to create and maintain a notebook in which to record, evaluate, and reflect on scientific processes and concepts.
5. Students will acquire college readiness skills, such as working cooperatively in diverse groups, thinking critically, and working with technology in the classroom.

COURSE OBJECTIVES

Upon completion of this course, the student will be able to:

1. Explain the goal of science and describe the scientific method.
2. Analyze and explain the structure and function of various cells and their organelles.
3. Examine and describe the structure of DNA.
4. Examine and discuss the process of evolution and the evidence that supports it.
5. Analyze, compare and explain the structure and function of different types of ecosystems.

SECTION II

COURSE CONTENT AND SCOPE

1. Biology in the 21st Century
   - 1.1. Introducing biology
     - 1.1.1. Scientific thinking and processes
   - 1.2. Chemistry of life
     - 1.2.1. Atoms, Ions, and molecules
     - 1.2.2. Properties of water
     - 1.2.3. Carbon-based molecules
     - 1.2.4. Chemical reactions
     - 1.2.5. Enzymes

COURSE CONTENT AND SCOPE (CONTINUED)

2. Cells
    2.1. Cell structure and function
        2.1.1. Cell theory
        2.1.2. Cell organelles and membrane
        2.1.3. Diffusion and osmosis
        2.1.4. Active transport, endocytosis, and exocytosis
    2.2. Cells and energy
        2.2.1. Chemical energy and ATP
        2.2.2. Photosynthesis
        2.2.3. Cellular respiration
        2.2.4. Fermentation
    2.3. Cell growth and division
        2.3.1. The cell cycle
        2.3.2. Mitosis and cytokinesis
        2.3.3. Asexual reproduction
        2.3.4. Multicellular life
3. Genetics
    3.1. Meiosis and mendel
        3.1.1. Chromosomes and meiosis
        3.1.2. Mendel and heredity
        3.1.3. Traits, genes, and alleles
        3.1.4. Traits, probability, and genetic variation
    3.2. Mendelian genetics
        3.2.1. Chromosomes and phenotype
        3.2.2. Complex patterns of inheritance
        3.2.3. Gene linkage and mapping
        3.2.4. Human genetics and pedigree
    3.3. Molecular biology
        3.3.1. Identifying DNA as the genetic material
        3.3.2. Structure of DNA
        3.3.3. DNA replication
        3.3.4. Transcription and translation
        3.3.5. Gene expression and regulation
        3.3.6. Mutations
    3.4. Biotechnology
        3.4.1. Manipulating and copying DNA
        3.4.2. DNA fingerprinting
        3.4.3. Genetic engineering
        3.4.4. Genomics and bioinformatics
        3.4.5. Genetic screening and gene therapy
4. Evolution
    4.1. Principles of evolution
        4.1.1. Darwin’s observations
        4.1.2. Theory of natural selection

COURSE CONTENT AND SCOPE (CONTINUED)

- 4.2. The evolution of populations
  - 4.2.1. Genetic variations within populations
  - 4.2.2. Natural selection within populations
  - 4.2.3. Patterns in evolution
  - 4.2.4. Hardy-Weinberg equilibrium
  - 4.2.5. Speciation through isolation
- 4.3. The history of life
  - 4.3.1. The fossil record
  - 4.3.2. The geologic time scale
  - 4.3.3. Origin of life
  - 4.3.4. Early-single celled organisms
  - 4.3.5. Primate evolution

5. Ecology
   - 5.1. Principles of ecology
     - 5.1.1. Ecological relationships
     - 5.1.2. Biotic and abiotic factors
     - 5.1.3. Food chains and food webs
   - 5.2. Interactions in ecosystems
     - 5.2.1. Habitat and niche
     - 5.2.2. Community interactions
     - 5.2.3. Population density, distribution, and growth patterns
   - 5.3. The biosphere
     - 5.3.1. Climate, biomes, and marine ecosystems
   - 5.4. Human impact on ecosystems
     - 5.4.1. Human population growth and natural resources
     - 5.4.2. Air and water quality
     - 5.4.3. Threats to biodiversity
     - 5.4.4. Conservation

APPROPRIATE READINGS

Students may be given reading assignments from the textbook and current research studies related to the course material.

WRITING ASSIGNMENTS

Written analysis of class laboratory experiments and research studies related to the course material. Students will also create and maintain a notebook to record scientific processes and concepts.

OUTSIDE ASSIGNMENTS

Assignments may include but are not limited to: appropriate research projects, reading and writing assignments.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Students will write up a laboratory report answering questions based on virtual laboratory experiments and virtual class demonstrations.

EVALUATION

Evaluation methodologies will be consistent with, but not limited by, the following types or examples:

1. Written exams which include essay questions to test for content, terminology, and knowledge of subject matter.
2. Post-laboratory reports to assess knowledge and understanding of major scientific concepts.
3. Laboratory write-up and exam questions to assess student's ability to read, interpret, or construct a data table or graph based on course related data.
4. Participation of in-class discussions related to course material and lecture topic.
5. Project-based learning experiences related to course material.

METHOD OF INSTRUCTION

Instructional methodologies will be consistent with, but not limited by, the following types or examples:

Lectures, laboratory, seminars, virtual laboratory experiments, virtual class demonstrations, collaborative group projects and field trips.

This course, or sections, of this course, may be offered through distance education.

TEXTS AND SUPPLIES

Texts:
1. Nowicki, Stephen, *Biology*, McDougal Littell, current edition.

Supplies:
1. Instructor supplied supplemental written materials.
2. Online supplemental textbook resources for virtual labs and dissections.

PREPARED BY: Holly Rodriquez DATE 9/29/13

REVISED BY: Leticia Flores DATE June 3, 2020

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

REFERENCES:

San Diego Community College District Policy 3100

California Community Colleges, Title 5, Section 55002
Continuing Education Catalog