Las Positas College
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Course Outline for BIOL 31

INTRO TO COLLEGE BIOLOGY

Effective: Fall 2008

I. CATALOG DESCRIPTION:
BIOL 31 — INTRO TO COLLEGE BIOLOGY — 4.00 units

Basic principles of biology. Cell structure and function, cell division, cell metabolism, reproduction, genetics, taxonomy, origin of life, and evolution. Laboratory emphasis on developing various laboratory skills, using the metric system, collecting data, graphing, interpreting data, and preparing for and taking laboratory exams. Designed to prepare the necessary concepts and laboratory skills and experience that are needed to succeed in more advanced courses in biology.

3.00 Units Lecture 1.00 Units Lab

Prerequisite
ENG 1A - Critical Reading and Composition

Strongly Recommended
MATH 110 - Elementary Algebra
or

MATH 110B - Elementary Algebra B
or

MATH 65Y - Elementary Algebra
and

Grading Methods:
Letter Grade

Discipline:

	MIN
Lecture Hours:	54.00
Lab Hours:	54.00
Total Hours:	108.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. ENG1A

Before entering this course, it is strongly recommended that the student should be able to:

A. MATH110
B. MATH110B
C. MATH65Y

IV. MEASURABLE OBJECTIVES:

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

A. Describe and apply the scientific method and how it is used by scientists to further scientific knowledge;
B. Cite the characteristics and levels of organization exhibited by all living organisms;
C. Know the use of light microscope and dissecting scope.
D. Describe how cells/specialized cells are structured and function;
E. Describe basic cell metabolism
F. Describe/contrast, mitosis, and meiosis,
G. Describe structure, transmission and expression of genes
H. Explain the Darwinian concept of evolution as modified by modern scientific knowledge;
I. Describe how the modern (binomial) system names and classifies organisms.

V. CONTENT:

A. Introduction – Exploring Life
   1. Characteristics of life
   2. Levels of organization
   3. Process of science
      a. Nature of biological inquiry
      b. Power of experimental tests

B. Chemical Basis of Life
   1. Elements, atoms, molecules, ions
   2. Chemical bonds in biological molecules
   3. Properties of water
   4. Acids, bases, pH and buffers

C. Molecules of Life
   1. Molecules of life from structure to function
   2. Chemical reactions, synthesis and hydrolysis reactions
   3. Carbohydrates, lipids, proteins, nucleic acids

D. Structure and Function of the Cell
   1. Introduction to the cell – Prokaryotes – Eukaryotes
   2. Eukaryotes – Organelles

E. Working Cell
   1. Membrane structure and function
   2. Enzyme structure and function

F. Cellular Metabolism
   1. Energy relationships, Cellular Respiration/Photosynthesis; Autotrophs/Heterotrophs
   2. Stages of cellular respiration and fermentation and photosynthesis
   3. Organic molecules as fuel for cellular respiration
   4. Products of cell respiration-where/how they are used.

G. How Cells Reproduce
   1. Nuclear and cell division mechanisms
   2. Eukaryotic cell cycle and mitosis
      a. Meiosis and sexual reproduction
   3. Crossing over
   4. Alterations of chromosome number and structure

H. Observing Patterns in Inherited Traits
   1. Mendel's insight into inheritance patterns
   2. Variations on Mendel's Law

I. Chromosomes/Human Genetics/Inherited Diseases
   1. Chromosomal basis of inheritance
   2. Sex chromosomes and sex linked genes

J. DNA Structure and Function
   1. Discovery of DNA structure
   2. DNA replication and repair

K. DNA to Proteins
   1. How is RNA transcribed from DNA
   2. Deciphering mRNA transcripts
   3. Translating mRNA into protein
   4. Mutations

L. Control of Gene Expression
   1. Gene regulation
   2. Differentiation

M. DNA Technology

N. Process of Evolution
   1. Theory of natural selection
   2. Population genetics
   3. Modes of natural selection

O. Macroevolution and Microevolution
   1. Concept of species
   2. Mechanism of speciation

P. Origin and Early Evolution of Life
   1. How did cells originate (Early earth)
   2. First cells

Q. Characteristics and Relationships among Domains and Eukaryotic Kingdoms (systematics)

R. Human Anatomy and Physiology
   1. Selected organ systems

S. Basic Principle of Ecology and ecological relationships
   1. Populations
   2. Communities
   3. Ecosystems

T. The microscope

U. Microscopic study of cells

V. Chemistry for biologists

W. Unicellular Organisms

X. Movement across membranes

Y. Enzyme function

A@. Cellular respiration

AA. Cell division and cell specialization

AB. Patterns of Inheritance

AC. DNA

AD. iotechnology

AE. Selected Organ Systems (i.e., Cardiovascular, Excretory, Respiratory, Skeletal)

AF. Plants and/or photosynthesis

VI. METHODS OF INSTRUCTION:

A. **Discussion** -
B. **Lecture** -
C. Multimedia presentations
D. **Lab** -

VII. TYPICAL ASSIGNMENTS:

A. Quiz before labs B. Genetics problems C. Written assignments

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes
3. Papers
4. Lab Activities
5. Other:
    a. Methods
        1. Midterms and quizzes
        2. Laboratory practical exams
        3. Laboratory reports
        4. Final examination

B. **Frequency**

1. Frequency of evaluation
    a. Minimum of one midterm
    b. Minimum of one lab practical or test
    c. Minimum of one lab report or written assignment
    d. Final examination

IX. TYPICAL TEXTS:

1. Campbell, Reece and Simon Taylor *Biology, Concepts and Connections.* 5th ed., Pearson/Benjamin Cummings, 2008.
2. Madder, Sylvia S *Inquiry to Life.* 12th ed., McGraw-Hill, 2008.
3. Drs. Braganza and Collins *Laboratory Exercises in Biology.*, -, 2007.
4. Adams, Jim *Biology 31 Lab Manual.*, -, 2007.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

A. In addition to textbook, student may use publishers website, student CD (provided with the text), and other media.