GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: BIO 10 DIVISION: 10 ALSO LISTED AS:

TERM EFFECTIVE: Summer 2020 CURRICULUM APPROVAL DATE: 12/14/2021

SHORT TITLE: PRIN BIOLOGY L/L

LONG TITLE: Principles of Biology

Units	Number of Weeks	Type	Contact Hours/Week	Total Contact Hours
4	18	Lecture:	3	54
		Lab:	3	54
		Other:	0	0
		Total:	6	108

Out of Class Hrs:	108.00
Total Learning Hrs:	216.00

COURSE DESCRIPTION:

An introductory biology course covering functions at the cellular and organismal levels. Includes study of the basic principles of metabolism, heredity, evolution and ecology. Primarily for non-biological science majors. ADVISORY: High school-level reading and writing skills, and MATH 430 or skills equivalent to those in an Elementary Algebra course.

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. Describe and explain the processes and structures common to all living things.
2. Explain how evolution drives and shapes an ecosystem, and has resulted in both the similarities and differences between all living things.
3. Explain the process of how traits are inherited, and how genes are responsible for those traits.
4. Demonstrate the use of a compound light microscope and other laboratory equipment.

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Define and explain the differences between the following: atom, molecule, compound, ion, isotope.
2. Describe the characteristics of living things.
3. Explain and apply the steps of the scientific process.
4. Explain and compare the different types of chemical bonding.
5. Describe the basic system of taxonomy used in biology.
6. Describe the basic forms and functions of the four classes of biologically important molecules.
7. Describe the differences between prokaryotic and eukaryotic cells.
8. Describe the structures and functions of the cell membrane.
9. Explain the function of enzymes in living systems.
10. Explain the functions of cellular respiration and photosynthesis.
11. Describe the cell cycle, including mitosis and meiosis, and explain how it differs from a life cycle.
12. Explain how the Principle of Segregation and the Principle of Independent Assortment affect the inheritance of specific genes.
13. Explain the relationship between a gene and the protein coded for by a gene.
14. Explain Darwin's theory of evolution by natural selection, and the forms of evidence used to demonstrate that evolution has occurred.
15. Describe mutation, gene flow, genetic drift, and natural selection, and explain how each affects the genetic variability within a single population and between two populations of the same species.
16. Explain the four major types of community interactions: competition; predation; parasitism; and mutualism.
17. Explain how energy and nutrients flow through a community, and how this flow results in the pyramid of biomass.
18. Describe the human impact on Earth's ecosystems and climate.

COURSE CONTENT:

Curriculum Approval Date: 12/14/2021

LECTURE CONTENT:

3 HOURS

INTRODUCTION TO BIOLOGY: scientific process, characteristics of living things, taxonomy

3 HOURS

BASIC CHEMISTRY: atoms, bonds, molecules, water, pH

3 HOURS

MACROMOLECULES: carbohydrates, lipids, nucleic acids, proteins

6 HOURS

CELL STRUCTURE AND FUNCTION: cell theory, prokaryotic and eukaryotic cells, plasma membrane, membrane transport

3 HOURS

ENERGY & ENZYMES: laws of thermodynamics, ATP, enzyme function

3 HOURS

METABOLISM: cellular respiration, fermentation

3 HOURS

PHOTOSYNTHESIS: pigments, light reactions, Calvin cycle

6 HOURS

CELL CYCLE: interphase, mitosis, meiosis

7 HOURS

GENETICS: Mendel?s laws of inheritance, genotype, phenotype, alleles, complete dominance, incomplete dominance, codominance, sex-linked genes

3 HOURS

GENE EXPRESSION: replication, transcription, translation, mutations

3 HOURS

EVOLUTION: history of evolutionary thought, natural selection, evidence, misconceptions

3 HOURS

POPULATIONS: mutation, gene flow, genetic drift, natural selection, Hardy-Weinberg equilibrium

3 HOURS

COMMUNITIES: community interactions, keystone species, ecological succession

3 HOURS

ECOLOGY: biotic and abiotic components, ecosystems, energy and nutrient flow, human impact

2 HOURS

Final Exam

COURSE CONTENT(CONTINUED):

LAB CONTENT:

6 HOURS

LAB RULES, LAB SAFETY, SCIENTIFIC PROCESS

6 HOURS

USE OF THE MICROSCOPE: proper usage, wet mounts, simple stain

6 HOURS

CELL STRUCTURE & MEMBRANE TRANSPORT: organelles, osmosis, surface area and volume

3 HOURS

Review lab topics

3 HOURS

ENZYMES: effect of surface area, high temperature, and pH on enzyme

3 HOURS

METABOLISM: cell respiration, fermentation

3 HOURS

PHOTOSYNTHESIS: pigments, paper chromatography, nature of light

3 HOURS

MITOSIS & MEIOSIS: purpose, phases, animal vs. plant cell mitosis

3 HOURS

Review lab topics

3 HOURS

GENETICS: inheritance of traits that have complete dominance, incomplete dominance, codominance, X-linkage

3 HOURS

GENE EXPRESSION: overall process, DNA structure and function, effect of UV radiation on DNA

3 HOURS

EVOLUTION & COMPARATIVE ANATOMY: homologous and analogous structures, Darwin?s finches

3 HOURS

NATURAL SELECTION: Hardy-Weinberg equilibrium populations

3 HOURS

ECOLOGY: communities on campus, trophic levels, food webs

3 HOURS

Lab Exam

METHODS OF INSTRUCTION:

Instructional Methods include lecture and lab with use of audio/visual aids, group discussions, and hands-on laboratory exercises.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 78

Assignment Description:

Lecture homework and online equivalent assignments

Required Outside Hours: 30

Assignment Description:

Lab reports or online equivalent

METHODS OF EVALUATION:

Writing assignments

Evaluation Percent 25

Evaluation Description

Percent range of total grade: 20-30% Questions requiring written responses will be used in a combination of online Discussion Boards, Homework, Lab Reports, and Free Response exam questions.

Problem-solving assignments

Evaluation Percent 15

Evaluation Description

Percent range of total grade: 10-20% Questions of this nature will be used in a combination of Homework, Lab Reports, Quizzes, and Exams.

Objective examinations

Evaluation Percent 60

Evaluation Description

Percent range of total grade: 50-70% A combination of Multiple Choice, True/False, Matching, Fill-In, and Free Response questions.

REPRESENTATIVE TEXTBOOKS:

Fowler, et al.. Concepts of Biology. OpenStax,2020.

This textbook is OER and makes this a ZTC course. It is comparable in quality to the book that was previously used.

ISBN: 9781947172036

Reading Level of Text, Grade: 13 Verified by: Publisher

Biology **Required Other Texts and Materials**

10 Laboratory Manual

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:
- GAV B2, effective 201230
- GAV B3, effective 201230

CSU GE:
- CSU B2, effective 201230
- CSU B3, effective 201230

IGETC:
- IGETC 5B, effective 201230
- IGETC 5C, effective 201230

CSU TRANSFER:
- Transferable CSU, effective 201230
- Not Transferable

UC TRANSFER:
- Transferable UC, effective 201230
- Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN:
CAN Sequence:
CSU Crosswalk Course Department:
CSU Crosswalk Course Number:
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000310399
Sports/Physical Education Course: N
Taxonomy of Program: 040100