

Lassen Community College Course Outline

BIOL-32L General Biology with Laboratory

4.0 Units

I. Catalog Description

A general survey of the living world with emphasis on the basic biological principles as illustrated in plant and animal groups. This course includes a laboratory section supporting the basic concepts of the course. This course has been approved for hybrid delivery. This course has been approved for online delivery for emergency use only.

Recommended Preparation: Successful completion of ENGL105 or equivalent multiple measures placement.

Transfers to CSU/UC

51 Hours Lecture, 102 Expected Outside Class Hours, 51 Hours Laboratory, 204 Total Student Learning Hours

Scheduled: Fall, Spring

II. Coding Information

Repeatability: Not Repeatable, Take

1 Time Grading Option: Graded or

Pass/No Pass Credit Type: Credit -

Degree Applicable TOP Code:

040100

III. Course Objectives

A. Course Student Learning Outcomes

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

1. Describe a biological process involved with a living organism
2. Describe the key characteristics of all life forms from the atom to the organism.
3. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data; and finally proposing new questions about the topic.
4. Perform biological laboratory skills and display a habit of good laboratory practices.

B. Course Objectives

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

1. Describe the areas covered by: biology, zoology, botany, cytology, anatomy, physiology, microbiology, genetics, taxonomy and ecology.
2. Explain biological classification.
3. Apply the scientific method.
4. Discuss the basic characteristics of life.
5. Explain the three tenets of cell theory

6. Describe atomic and molecular structure.
7. Describe the major kinds of biologically important compounds.
8. Define differences between prokaryotic and eukaryotic cells.
9. Define differences between respiration and photosynthesis.
10. Identify the parts of plant and animal cells and tell what their functions are.
11. Describe the cell cycle and mitosis and meiosis and its importance.
12. Understand DNA replication.
13. Describe protein synthesis
14. Explain the basic laws of heredity and distinguish between mono and hybrid crosses.
15. Apply the idea of variation to populations of organisms and it to taxonomy.
16. Define evolution by natural selection as the key mechanism of evolution.
17. The biological species concept, the process of speciation, and the reproductive barriers that keep the species apart
18. Describe major hypotheses about life origins and macroevolution highlights of Pangea and plate tectonics.
19. Identify major characteristics of prokaryotes- Bacteria and Archaea
20. Define protists and identify their major characteristics.
21. Describe the relationship between viruses, bacteria, and fungi to the world around them.
22. Describe major groups of algae and explain their importance to the world
23. Describe fungi and lichens and their importance to the world.
24. Distinguish vascular plants on the basis of structure.
25. Describe some of the major groups of invertebrates and their importance to the biosphere.
26. Describe the five classes of vertebrates and relate them to the world around us.
27. Describe major events in primate evolution leading to humans.
28. Explain what ecology is and some of its more important implications to the world around us.
29. Operate a variety of instruments (compound microscope, dissecting microscope, metric scale, centrifuge, and spectrophotometer) and utilize laboratory lab ware (graduated cylinders, beakers, serological pipettes, etc.)
30. Identify methodologies and reagents utilized to recognize carbohydrates, lipids, proteins, and nucleic acids.
31. Perform procedures associated with membrane function (diffusion, osmosis, and endocytosis).
32. Identify, compare and contrast various organelles and cells under a microscope
33. Identify, compare and contrast various animal and plant tissues under a microscope.
34. Describe factors affecting enzyme function.
35. Analyze evidence supporting the theory of evolution through natural selection.

IV. Course Content

Lecture Content

The following topics may be included; however, the order of presentation, relative emphasis and the depth of treatment will

depend on the preferences of the instructor.

- A. Introduction to Biology**
 - 1. Major Fields of Science
 - 2. Science and Scientists
 - a. The scientific method - hypothesis - theory
 - b. Ancient science
 - 3. Characteristics of life
 - 4. Biogenesis vs Spontaneous generation
- B. Basic Chemical Principles**
 - 1. Atomic structure
 - 2. Isotopes
 - 3. Molecular structure
 - 4. Types of bonds
 - 5. Organic and inorganic chemistry
 - 6. Chemical structure of biological materials
 - 7. Chemical transformation of biological materials
 - a. Cellular respiration
 - b. Photosynthesis
- C. Cytology**
 - 1. Historical perspective
 - 2. Cell structure and function
 - 3. Cell cycle and cancer
- D. Mitosis and Meiosis**
- E. Genetics and Heredity**
 - 1. Protein synthesis and phenotype vs genotype
 - 2. Mendel's laws
 - 3. Mono and dihybrid crosses
 - 4. Sex-linked characteristics
- F. Classification of Organisms**
 - 1. Modern system - Linnaeus
 - 2. Variation and mutation
 - 3. Classification problems – bacteria and protista
- G. Viruses and Bacteria**
 - 1. Definition
 - 2. Types and shapes
 - 3. Relationships to man and the world
- H. Fungi**
 - 1. Types
 - 2. Importance biologically
- I. Algae**
 - 1. Types
 - 2. Importance biologically
- J. Lichens**
 - 1. Symbiosis
- K. Bryophytes (first group of true plants)**
- L. Vascular Plants**

1. Ferns
 2. Gymnosperms
 3. Angiosperms
 - a. Structure of roots, stems, leaves, and flowers
 - b. Importance
- M.** Invertebrates (Selected groups to illustrate diversity and importance (i.e. Arthropods -metamorphosis, Annelids - segmentation, Platyhelminthes - parasitism, Mollusca - food, Echinoderms - radial and bilateral symmetry)
- N.** Vertebrates
1. Mammal groups and characteristics
 2. Birds - structure and importance
 3. Reptiles - types and importance
 4. Amphibians - types and importance
 5. Fish - types and importance
- O.** Primate Evolution and Human characteristics
1. Where Humans came from and how they dispersed
- P.** Ecology
1. Energy pathways related to trophic pyramids
 2. Biotic communities
 3. Biodiversity
 4. Human impacts on biodiversity

Laboratory Content

- A. Observing Life (Introduction to the Compound Microscope)
- B. Observing Laboratory Basic Equipment and Procedures
Scientific Inquiry and Experimental Design
- C. Observing Organic Molecules
Molecular Models
- D. Observing Membrane Function
- E. Observing Eukaryotic Cell Structure
- F. Observing Cell Specialization
- G. Observing Enzyme Function
- H. Observing DNA
- J. Observing Cellular Asexual Reproduction
- M. Observing Classical Genetics
- N. Observing Human Genetics in Populations
- O. Observing Natural Selection
- P. Observing how to use a Taxonomic Key
- Q. Observing Origins of Life
- R. Observing Characteristics of Plant
- S. Observing Characteristics of Invertebrates
- T. Observing Characteristics of Vertebrates
- U. Observing Primate Evolution

V. Assignments

A. Appropriate Readings

Standard college level texts will be the primary source of course readings.

Writing Assignments

In order to successfully complete this course, students must demonstrate understanding of course content on mixed-format (including essay) examinations and laboratory exercise write-ups.

B. Expected Outside Assignments

Examples of outside assignments may include, but are not limited to:

1. Preparation for all laboratory exercises and studying for quizzes and laboratory practical exam(s) occurs outside of class.
2. All text reading and note review is conducted outside of class. Students may elect to do a research paper which must conform to college level work.

C. Specific Assignments that Demonstrate Critical Thinking

1. Analysis of a variety of laboratory experiment procedures and results
2. Design of an independent laboratory experiment
3. The essay component of each unit exam is designed to challenge students to analyze and synthesize information presented in the text and during lecture.

VI. Methods of Evaluation

Traditional Classroom Instruction

The first day of class the instructor will provide each student with a written course syllabus indicating the evaluation procedures to be used. The formulation of a student grade will be based upon performance on mixed-format examinations.

1. Performance on laboratory exercises and write-ups of those exercises
2. Written presentation of an independently developed laboratory experiment
3. Laboratory Practical exam(s)
4. Performance on mixed-format including essay questions asking students to critically analyze topics discussed in class.

Hybrid Evaluation

All quizzes and exams will be administered during the in person class time.

Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course.

Electronic communication, both synchronous and asynchronous will be evaluated for participation and to maintain effective communication between instructor and students.

Online Evaluation

A variety of methods will be used, such as: research papers, asynchronous and synchronous (chat/ forum) discussions, online quizzes and exams, posting to online website and email communications.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery

Hybrid Delivery

Correspondence Delivery

Online Delivery

Traditional Classroom Instruction

Laboratory, discussion, audio-visual media and other appropriate methods to be determined by the instructor.

Hybrid Delivery

Hybrid modality may involve face to face instruction mixed with online instruction. A minimum of 1/3 of instruction including 100 % of labs will be face to face. The remaining hours will be taught online through a technology platform as adopted by the district.

Online Delivery

Participation in forum based discussions. Online exercises/assignments contained on website. Web based video vignettes with discussion paper, email communications, postings to forums, online lecture notes and web links will comprise the method of instruction.

VIII. Representative Texts and Supplies

Required text:

Campbell, Neil, Eric Simon, Jean Dickey, Kelly Hogan and Jane Reece, *Campbell Essential Biology (w/MasteringBiology Access) Edition: 7th, 2019*, Pearson, ISBN: 9780134812946

In-house, Observations in Biology Lab Exercises

IX. Discipline/s Assignment

Biological Sciences

X. Course Status

Current Status: Active

Original Approval Date:

05/20/2014 Board Approval

Date: 12/13/2016 Chancellor

Approval Date: 01/20/2017

Revised By: Crystal Tobola

Curriculum/Academic Standards Committee Revision Date: 12/06/2022