

**College of San Mateo
Official Course Outline**

1. COURSE ID: BIOL 100 **TITLE:** Introduction to the Life Sciences

Units: 3.0 units **Hours/Semester:** 48.0-54.0 Lecture hours; and 96.0-108.0 Homework hours

Method of Grading: Letter Grade Only

Recommended Preparation:

Eligibility for ENGL 838 or ENGL 848 or ESL 400.
And any READ 400 level course.

2. COURSE DESIGNATION:

Degree Credit

Transfer credit: CSU; UC

AA/AS Degree Requirements:

CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science

CSU GE:

CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B2 - Life Science

IGETC:

IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: B: Biological Science

3. COURSE DESCRIPTIONS:

Catalog Description:

Fundamental principles of life. The awareness of plant and animal interrelations and interdependencies. Examines the human role in the world of living things in relation to contemporary problems. One or more field trips may be required. (Intended for non-science majors with no previous experience in the biological sciences.)

4. STUDENT LEARNING OUTCOME(S) (SLO'S):

Upon successful completion of this course, a student will meet the following outcomes:

1. Explain the principles of evolution that underlie all of biology.
2. Describe relationships and dynamics in ecosystems.
3. Relate molecular structure and function in cells and organisms.
4. Describe the diversity of organisms.
5. Follow instructions, work cooperatively during group activities using skills learned in class, and apply the scientific method to investigate biological phenomena, evaluate current issues and solve both quantitative and conceptual problems in Biology.

5. SPECIFIC INSTRUCTIONAL OBJECTIVES:

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

1. Same as SLOs.

6. COURSE CONTENT:

Lecture Content:

For SLOs C and D

1. Scientific method

For SLOs A, B, and E

1. Characteristics of Life
 2. Evolution-terms, fundamental concepts, examples
 - A. Landmarks in history of evolutionary theory; evidence for evolution
 - B. Principle of Natural Selection
 - C. Adaptations, populations, species, sympatric & allopatric speciation
 - D. Microevolution, macroevolution processes, mechanisms, importance of variation
 - E. Origin of Life: earth's history, chemical evolution, levels of organization
 - F. Prokaryotic and eukaryotic domains, kingdoms, evolutionary relationships; endosymbiont hypothesis of eukaryote evolution; evolution of multicellular organisms.
Introduction to the Tree of Life.
- For SLOs A, B, and E
1. Ecology-terms, fundamental concepts, examples
 - A. Community, abiotic, biotic environment, niche, producer, consumer, trophic levels

- B. Energy flow, mass cycles, food webs & pyramids
- C. Species interactions, coevolution
- 2. Chemistry
 - A. Atomic and molecular structure
 - B. Water chemistry, importance to living systems
 - C. Molecules of cells; interactions with water, organic substances, basic structure and characteristics of carbohydrates, lipids, proteins, nucleic acids
 - D. Proteins: diverse functions, information content/specificity
 - E. Energy conversions: metabolic pathways, roles of enzymes in cell metabolism
 - F. Photosynthesis, Cellular respiration
- For SLOs A, B, and E
- 1. Molecular Biology
 - A. DNA structure replication
 - B. RNA, genetic code
 - C. Protein synthesis
 - D. Mutation
 - E. Mendelian inheritance-terms, fundamental concepts, examples
- 2. Cells
 - A. General characteristics, prokaryotic structure, eukaryotic organelles
 - B. Membrane structure and function; transport
 - C. Cell division and organismal reproduction; asexual and sexual reproduction, mitosis, meiosis, haploid, diploid cells
- For SLOs A, B, C, D, and E
- 1. Survey of traditional five kingdoms, and discussion of current concepts/views of classification. Diversity of life as portrayed in the Tree of Life.
 - A. Metabolic diversity, roles in ecosystems, interactions with humans, of Bacteria & Archaea, Protista, Fungi, Plants, Animals
 - B. Advantages, problems of aquatic and terrestrial living for algae/plants, animals
 - C. Plants: trends in evolution, characteristics of major groups of land plants, seeds, flowers, fruits. Current classification schemes.
 - D. Animals: trends in evolution, characteristics of major phyla; Vertebrates trends in evolution, characteristics of classes. Current classification schemes.
 - E. Fungi: trends in evolution, characteristics of major phyla. Current classification schemes.

Lab Content:

This is a lecture only class, no labs.

TBA Hours Content:

No TBAs in this class.

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Activity
- C. Discussion
- D. Field Experience
- E. Field Trips
- F. Guest Speakers
- G. Observation and Demonstration
- H. Service Learning
- I. Other (Specify): Discussions, group activities, critique of videos or documentaries, journals, oral presentations, posters, online homework, field trip report and in-class discussion, written papers.

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

- 1. Homework assignments related to textbook readings and supplemental to textbook readings. Some of the assignments may include answering review questions, short essays, or a report on a current issue in biology.
- 2. Term paper that includes a library search of appropriate valid scientific sources, and proper citation of sources.
- 3. Report based on a field trip.

4. Report based on a service learning activity.
5. Metacognitive (reading) logs based on short articles or textbook chapters.
6. Reflective journals.
7. Oral or poster presentations related to a selected class topic.

Reading Assignments:

1. Instructions for class assignments, quizzes, tests, and other class assignments.
2. Reading assignments for each of the textbook chapters.
3. Reading selected papers from the library journal database.

Other Outside Assignments:

1. Review of biology videos housed in the library database collection.
2. Review of appropriate documentaries from the Nature or Nova PBS or other appropriate website.
3. Visit to a local botanical garden or park to study biomes or biological phenomena.
4. Online assignments and assessments in selected publisher websites.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Participation
- B. Class Work
- C. Exams/Tests
- D. Field Trips
- E. Group Projects
- F. Homework
- G. Oral Presentation
- H. Papers
- I. Portfolios
- J. Projects
- K. Quizzes
- L. Research Projects
- M. Simulation
- N. Written examination
- O. Objective exams (true/false, multiple choice, fill-in blanks, short essay), essays, term paper, take-home exams, reports on videos, reports on journal articles, reading logs, oral presentations, group worksheets. Weekly homework assignments. Participation in field trips, in class discussions, and in group activities.

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Hoefnagels, Marielle. *Biology Essentials*, 3 ed. McGraw Hill, 2019
- B. Phelan, Jay. *What is Life? A Guide to Biology and Physiology*, 4th ed. Macmillan, 2018
- C. Eric J. Simon, Jean L. Dickey and Jane B. Reece. *Essentials of Biology*, 6 ed. Pearson, 2019
- D. Fowler, Samantha, Roush, Rebecca, Wise, James.. *Concepts of Biology*, 1 ed. OpenStax, 2016

Origination Date: May 2017

Curriculum Committee Approval Date: October 2019

Effective Term: Fall 2020

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