



# ILLINOIS VALLEY COMMUNITY COLLEGE

## COURSE OUTLINE

**DIVISION:** Natural Science and Business

**COURSE:** BIO 1001 General Biology I

Date: Spring 2022

Credit Hours: 4

*Complete all that apply or mark "None" where appropriate:*

Prerequisite(s): None

Enrollment by assessment or other measure?  Yes  No

If yes, please describe:

Corequisite(s): None

Pre- or Corequisite(s): None

Consent of Instructor:  Yes  No

Delivery Method:

<input checked="" type="checkbox"/> Lecture	3 Contact Hours (1 contact = 1 credit hour)
<input type="checkbox"/> Seminar	0 Contact Hours (1 contact = 1 credit hour)
<input checked="" type="checkbox"/> Lab	2 Contact Hours (2-3 contact = 1 credit hour)
<input type="checkbox"/> Clinical	0 Contact Hours (3 contact = 1 credit hour)
<input checked="" type="checkbox"/> Online	
<input checked="" type="checkbox"/> Blended	
<input checked="" type="checkbox"/> Virtual Class Meeting (VCM)	

Offered:  Fall  Spring  Summer

**CATALOG DESCRIPTION and IAI NUMBER (if applicable):**

An integrated course covering the fundamentals of the plant and animal world. Special attention is given to the structure and function of cells, the genetic continuity of life, evolution and ecology. IAI Equivalent: L1-900L

## **ACCREDITATION STATEMENTS AND COURSE NOTES:**

None

## **COURSE TOPICS AND CONTENT REQUIREMENTS:**

1. The Study of Life
2. The Molecules of Cells
3. Cell Structure and Function
4. Membrane Structure and Function
5. Cell Division
6. Metabolism: Energy and Enzymes
7. Cellular Respiration
8. Photosynthesis
9. Plant Organization and Function
10. Patterns of Gene Inheritance
11. DNA Structure and Control of Gene Expression
12. Biotechnology
13. Evolution of Life
14. Ecology: Communities and Ecosystems
15. Human Impact on the Biosphere

## **INSTRUCTIONAL METHODS:**

1. Lecture - open to question and answer dialogue.
2. In class active learning activities.
3. Laboratory experiences.
4. Visual aids – Powerpoint presentations, videos, charts, and models.
5. Exams and quizzes in lectures and laboratory.

## **EVALUATION OF STUDENT ACHIEVEMENT:**

1. Textbook reading - assignments
2. Participation in class discussion and active learning assignments
3. Homework assignments and quizzes
4. Performing assigned laboratory exercises
5. Laboratory tests
  - A. Periodic practical tests or quizzes (following every three exercises) on laboratory work
6. Written exams (in addition to those for laboratory)
  - A. Three or four major 1 hour exams

## **INSTRUCTIONAL MATERIALS:**

### **Textbooks**

*Essentials of Biology*, Mader and Windelspecht, 6<sup>th</sup> Edition  
*Inquiry into Life Lab Manual*, 16<sup>th</sup> ed., Mader

### **Resources**

Laboratory equipment and supplies  
Additional handouts and videos  
Internet and specialized laboratory software

## **LEARNING OUTCOMES AND GOALS:**

### **Institutional Learning Outcomes**

- 1) Communication – to communicate effectively;
- 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion;
- 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally;
- 4) Responsibility – to recognize how personal choices affect self and society.

### **Course Outcomes and Competencies**

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

1. Identify the cell as the fundamental unit of all living organisms and demonstrate an understanding of the complex physical and chemical changes that constitutes life.
  - 1.1 Distinguish between prokaryotic and eukaryotic cells by description and examples.
  - 1.2 Identify and state the function of animal cell organelles.
  - 1.3 Identify and state the function of plant cell organelles.
  - 1.4 Describe the characteristics of life.
  - 1.5 Describe the taxonomy of living organisms.
  - 1.6 Name, identify, and describe proteins, lipids, carbohydrates, and nucleic acids.
  - 1.7 Demonstrate an understanding of the structure of the basic units of matter: atoms.
  - 1.8 Identify and describe the unique properties of water that are important to living organisms.
2. Demonstrate an understanding of the exchange of materials and energy between living organisms and their environments.
  - 2.1 Define and describe ways that molecules may enter or exit cells.
  - 2.2 Describe how solar energy is converted into chemical energy via photosynthesis.
  - 2.3 Describe and identify the structural and functional aspects of photosynthesis.
  - 2.4 Demonstrate an understanding of both aerobic and anaerobic cellular respiration.
3. Demonstrate an understanding of how living organisms maintain their internal environment.
  - 3.1 Define and describe the function of enzymes and their role in metabolism.
  - 3.2 Demonstrate an understanding of environmental factors that affect enzymes.
  - 3.3 Define and describe how living organisms maintain homeostasis.
4. Demonstrate an understanding of the continuity of life based on the reproduction of cells.
  - 4.1 Name, describe and identify the stages of mitosis.
  - 4.2 Describe the differences between plant and animal cell mitosis.
  - 4.3 Name, describe and identify the stages of meiosis.
5. Demonstrate an understanding of the genetic inheritance of parental traits and its chemical basis.
  - 5.1 Describe and explain the structure and function of DNA and RNA.
  - 5.2 Demonstrate an understanding of the Central Dogma of Molecular Genetics.
  - 5.3 Demonstrate an understanding of Mendelian Genetics and related components.

- 5.3 Demonstrate an understanding of the molecular basis of inheritance, including its role in genetic variations, genetic mutations and genetic disorders.
6. Demonstrate an understanding of plant organization and structure.
  - 6.1 Identify the structures and functions of the major components of a flowering plant body- roots, stems, and leaves.
  - 6.2 Describe the differences between monocotyledons and dicotyledons.
  - 6.3 Identify and describe the major plant tissues.
7. Demonstrate an understanding of the process of evolution: How and why living organisms change over time.
  - 7.1 Describe and explain chemical evolution.
  - 7.2 Describe and explain the process of natural selection and how it pertains to evolution.
  - 7.3 Identify and understand the evidence that supports the theory of evolution.
8. Demonstrate an understanding of ecological communities and human interactions with them.
  - 8.1 Distinguish between species richness and species diversity.
  - 8.2 Compare and contrast primary and secondary succession.
  - 8.3 Describe autotrophs and heterotrophs in an ecosystem.
  - 8.4 Describe trophic levels in an ecosystem.
  - 8.5 Summarize biogeochemical cycles for phosphorus, nitrogen, and carbon; explain how human activities affect the carbon cycle.
  - 8.6 Define biodiversity and explain the threats to it.
  - 8.7 Identify benefits of biodiversity
  - 8.8 Describe the impacts of human populations on land and water resources.
9. Demonstrate an understanding of the scientific method
  - 9.1 Describe the steps of the scientific method.
  - 9.2 Distinguish between a theory and a conclusion.