

Introduction to Biology I

Course Overview and Goals

This self-paced, introductory college-level biology course provides a broad overview of life and its underlying principles, designed specifically for online learners. Students will build foundational knowledge of the scientific method, the chemical basis of life, and biological macromolecules. Through structured modules, they will examine key topics such as cell structure, membrane function, metabolism, cellular respiration, and photosynthesis. Additional units introduce the fundamentals of genetics, including Mendelian inheritance, meiosis, and modern molecular biology concepts like gene expression and DNA replication. The course also touches on biotechnology, genomics, evolution, population genetics, and classification systems used to study biodiversity. Throughout the course, emphasis is placed on comprehension, application of core concepts, and understanding biology's relevance to everyday life, without requiring any laboratory or in-person components.

Credit Recommendation

[American Council on Education](#)

Level: Lower-Division Baccalaureate

Credits (SH): 3 | Subject: Introduction to Biology for Nonmajors | ACE ID: UPIS-0009

[National College Credit Recommendation Service \(NCCRS\)](#)

In the associate/certificate degree category OR in the lower division baccalaureate/associate degree category, 3 semester hours in Biology I and II, Ecology, Natural Science, or Integrated Science.

Learning Outcomes:

Upon successful completion of the course, students will be able to:

- Recognize the hierarchical organization of life and describe key characteristics of living organisms to establish a foundation in biological science.
- Explain the structure and function of biological macromolecules, including carbohydrates, proteins, lipids, and nucleic acids.
- Apply the scientific method to design experiments and investigate biological processes and phenomena.
- Compare prokaryotic and eukaryotic cells, analyzing their structural differences and functional adaptations.

- Create models of cellular processes such as cellular respiration, photosynthesis, and the cell cycle, and evaluate ethical considerations related to modern biological technologies like genetic engineering and conservation.

Instructor Information for Course:

For any course-related inquiries or assistance, please do not hesitate to contact our dedicated instructors at the provided email address: team@upistudy.com. Your academic success is our top priority, and our instructors are here to support you throughout the course.

Course Information

Self-study: Online course: To be completed on the UPI study's platform

Grading

For each course module, the aim is to assess a student's competence in a range of business management skills relevant to the course content and learning outcomes. Students are required to demonstrate an understanding of key business concepts, the application of skills to real work environments, and the ability to conduct independent research and analysis. Here are the following assessment tools utilized by UPI STUDY:

Attendance

Requirement of a minimum of study of 80 hours of study on the UPI study portal.

Quizzes

Quizzes are meant to test a student's comprehension of all lessons as they progress through the course.

Assignments

Assignments are intended to assess the student's application, analysis, and critical thinking skills about the concepts you learn in the course. One assignment is required for this course.

Final Exam

The final exam is a cumulative test designed to ensure that students have mastered the material in the course.

ACTIVITY	DESCRIPTION	WEIGHTAGE ON OVERALL GRADE
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QUIZ	5-QUESTION QUIZ PER SUBCHAPTER	20%
ASSIGNMENT	COMPLETING AND SCORING WELL ON THE PROVIDED FINAL ASSIGNMENT/PROJECT	30%
FINAL EXAM	118 MULTIPLE-CHOICE QUESTIONS	50%

Note: Failure To Submit Or Fulfill Any Required Course Component May Result In Failure Of The Class

The grading standards are detailed in the charts below and apply to all courses unless specified differently in the course outline. According to the requirements set by the American Council on Education (ACE) and National College Credit Recommendation Service (NCCRS), a score of 70 or above is required to pass any course.

ALPHA GRADE	GRADE POINT	LOW RANGE	HIGH RANGE	DESCRIPTION	GUIDELINE
A	4.00	90	100	ACHIEVEMENT IN COURSE OUTCOMES IS OUTSTANDING AND WARRANTS UNIQUE AND DISTINGUISHED RECOGNITION.	CONSIDERABLE EVIDENCE OF ORIGINAL THINKING; DEMONSTRATED CAPACITY TO ANALYZE, INTEGRATE AND EXTEND CONCEPTS; OUTSTANDING GRASP OF SUBJECT MATTER; CONSISTENT DEMONSTRATION OF PRACTICE WITH NO SUPERVISION AND GUIDANCE.
B	3.50	80	89	ACHIEVEMENT IN COURSE OUTCOMES IS ACCEPTABLE AND MEETS ABOVE-AVERAGE STANDARDS.	EVIDENCE OF SOLID GRASP OF SUBJECT MATTER; REASONABLE UNDERSTANDING OF RELEVANT IDEAS; SOME EVIDENCE OF CRITICAL CAPACITY AND ANALYSIS; CLEAR CONNECTIONS OF IDEAS AND NUMEROUS EXTENSIONS; REASONABLE DEMONSTRATION OF PRACTICE WITH MINIMAL SUPERVISION AND GUIDANCE.
C	3.00	70	79	ACHIEVEMENT IN COURSE OUTCOMES MEETS AVERAGE STANDARDS.	EVIDENCE OF SOME UNDERSTANDING OF SUBJECT MATTER AND RELEVANT IDEAS; ABILITY TO DEVELOP/APPLY SOLUTIONS TO SIMPLE PROBLEMS; MINIMAL CONNECTIONS OF IDEAS AND EXTENSIONS; DEMONSTRATION OF PRACTICE WITH PERIODIC SUPERVISION AND GUIDANCE.
PASS = A SCORE OF 70 OR HIGHER IS REQUIRED TO PASS.					

D	1.00	60	69	ACHIEVEMENT IN COURSE OUTCOMES IS MARGINAL AND MEETS MINIMAL STANDARDS.	EVIDENCE OF A MINIMAL UNDERSTANDING OF SUBJECT MATTER AND RELEVANT IDEAS; MINIMAL CONNECTIONS OF IDEAS; DEMONSTRATION OF PRACTICE WITH CONSTANT SUPERVISION AND GUIDANCE.
F	0.00	0.00	59	ACHIEVEMENT IN COURSE OUTCOMES IS INADEQUATE AND FAILS TO MEET MINIMAL STANDARDS.	INSUFFICIENT EVIDENCE OF UNDERSTANDING SUBJECT MATTER AND RELEVANT IDEAS; INABILITY TO CONNECT AND EXTEND IDEAS; INABILITY TO DEMONSTRATE PRACTICE.

Course Materials

Textbooks & Materials

Notes and content provided on the UPI study's platform

1. Clark, Mary Ann, Matthew Douglas, and Jung Choi. *Biology 2e*. OpenStax, 28 Mar. 2018. Last updated 10 July 2024 (web version), 25 June 2020 (PDF version). Available in hardcover, ISBN 978-1-947172-51-7; paperback, ISBN 978-1-50669-985-1; and digital formats. Accessed at <https://openstax.org/details/books/biology-2e>.

Detailed Curriculum

CHAPTER NUMBER	CHAPTER TITLE	CHAPTER OBJECTIVES	READING & ASSIGNMENTS	INSTRUCTIONAL HOURS
1	The Study of Life	Define biology and explain its role in studying life, including the key characteristics of living organisms. Understand the hierarchical levels of biological organization, the unifying theme of evolution, and the relationship between structure and function.	1.1 The Science of Biology 1.2 Themes and Concepts of Biology	2
2	Chemical Foundations of Life	Describe the basic structure of atoms, isotopes, ions, and molecules. Understand the unique properties of water essential for life. Explore the significance of carbon in forming diverse biological molecules.	2.1 Atoms, Isotopes, Ions, and Molecules 2.2 Water 2.3 Carbon	3
3	Biological Macromolecules	Explain the synthesis and breakdown of biological macromolecules. Identify the structure and function of carbohydrates, lipids, proteins, and nucleic acids.	3.1 Synthesis of Biological Macromolecules 3.2 Carbohydrates 3.3 Lipids 3.4 Proteins 3.5 Nucleic Acids	3

4	Cell Structure and Function	Understand the methodologies used to study cells. Differentiate between prokaryotic and eukaryotic cells. Describe the endomembrane system, cytoskeleton, and cell connections.	4.1 Studying Cells 4.2 Prokaryotic Cells 4.3 Eukaryotic Cells 4.4 The Endomembrane System 4.5 The Cytoskeleton 4.6 Connections between Cells	5
5	Structure and Function of Plasma Membranes	Identify the components and structure of plasma membranes. Differentiate between passive and active transport mechanisms. Understand the processes involved in bulk transport.	5.1 Components and Structure 5.2 Passive Transport 5.3 Active Transport 5.4 Bulk Transport	3
6	Metabolism	Explain energy transformation and metabolism. Describe the laws of thermodynamics and the role of ATP. Understand the function of enzymes in catalyzing metabolic reactions	6.1 Energy and Metabolism 6.2 Potential, Kinetic, Free, and Activation Energy 6.3 The Laws of Thermodynamics 6.4 ATP: Adenosine Triphosphate 6.5 Enzymes	5
7	Cellular Respiration and Photosynthesis	Understand energy flow in living systems. Explore the stages of cellular respiration and photosynthesis. Examine the	7.1 Energy in Living Systems 7.2 Glycolysis 7.3 Oxidation of Pyruvate and the Citric Acid Cycle	8

		regulation of metabolic pathways and their interconnections.	7.4 Oxidative Phosphorylation 7.5 Metabolism without Oxygen 7.6 Connections of Metabolic Pathways 7.7 Regulation of Cellular Respiration 7.8 Overview of Photosynthesis 7.9 The Light-Dependent Reactions 7.10 Using Light Energy to Make Organic Molecules	
8	Cell Communication and Reproduction	Explain the principles of cell signaling and signal transduction. Understand the mechanisms of cell division and the cell cycle. Explore the relationship between cell cycle control and cancer.	8.1 Signaling Molecules and Receptors 8.2 Propagation of the Signal 8.3 Response to the Signal 8.4 Signaling in Single-Celled Organisms 8.5 Cell Division 8.6 The Cell Cycle 8.7 Control of the Cell Cycle 8.8 Cancer and the Cell Cycle 8.9 Prokaryotic Cell Division	4
9	Fundamentals of Genetics	This chapter covers the basics of genetics and reproduction. It explains meiosis, the process that creates gametes and introduces genetic variation. Sexual reproduction combines these gametes to form genetically unique	Ch 9.1 The Process of Meiosis Ch 9.2 Sexual Reproduction Ch 9.3 Mendel's Experiments Ch 9.4 Characteristics and Traits Ch 9.5 Laws of Inheritance	4

		offspring. Mendel's experiments laid the foundation for understanding heredity through dominant and recessive traits.		
10	Modern Understandings of Inheritance	Explain the chromosomal theory of inheritance and genetic linkage. Understand the chromosomal basis of inherited disorders.	10.1 Chromosomal Theory and Genetic Linkage 10.2 Chromosomal Basis of Inherited Disorders.	1.0
11	DNA Structure and Function	Explore the historical understanding of DNA. Describe the structure, replication, and repair of DNA in prokaryotes and eukaryotes.	11.1 Historical Basis of DNA Understanding 11.2 DNA Structure and Sequencing 11.3 Basics of DNA Replication 11.4 DNA Replication in Prokaryotes 11.5 DNA Replication in Eukaryotes 11.6 DNA Repair	3.0
12	Genes, Proteins and Gene Expression.	Explain the genetic code and transcription/trans- lation processes. Understand gene regulation mechanisms in prokaryotes and eukaryotes.	12.1 The Genetic Code 12.2 Prokaryotic Transcription 12.3 Eukaryotic Transcription 12.4 RNA Processing in Eukaryotes 12.5 Ribosomes and Protein Synthesis 12.6 Regulation of Gene Expression 12.7 Prokaryotic Gene Regulation 12.8 Eukaryotic Epigenetic Gene Regulation	6.0

			12.9 Eukaryotic Transcription Gene Regulation 12.10 Eukaryotic Posttranscriptional Gene Regulation 12.11 Eukaryotic Translational and Posttranslational Gene Regulation 12.12 Cancer and Gene Regulation	
13	Biotechnology and Genomics	Understand the applications of biotechnology in genome mapping and sequencing. Explore the fields of genomics and proteomics.	13.1 Biotechnology 13.2 Mapping Genomes 13.3 Whole Genome Sequencing 13.4 Applying Genomics 13.5 Genomics and Proteomics	3
14	Evolution and Population Genetics	Explain the principles of evolution and species formation. Understand population genetics and adaptive evolution.	14.1 Understanding Evolution 14.2 Formation of New Species 14.3 Reconnection and Speciation Rates 14.4 Population Evolution 14.5 Population Genetics 14.6 Adaptive Evolution	3
15	Phylogenies Biodiversity	Explore the methods of classifying and organizing life. Understand evolutionary relationships through phylogenetic trees.	15.1 Organizing Life on Earth 15.2 Determining Evolutionary Relationships 15.3 Perspectives on the Phylogenetic Tree	3
	ASSIGNMENT/LAB	ASSIGNMENT		8
	EXAM 1 & 2	Final Exam		2
			TOTAL	66 Hours

Online Study Etiquette

Time Management:

While lectures are available for viewing at any time, it is recommended to establish a consistent study schedule to ensure steady progress through the course materials.

Distraction Management:

Keep phones in silent mode or away during study sessions to minimize distractions. Designated breaks are encouraged for checking phones and attending to personal tasks.

Device Usage:

Use laptops, tablets, or other devices primarily for accessing course materials and taking notes. Avoid unrelated activities on these devices during study sessions to maintain focus.

Academic Policies

Student Code of Conduct

Introduction

UPI's Code of Conduct establishes the standards of acceptable behavior for all students. This code aims to uphold UPI's reputation, integrity, and foster a safe, inclusive, and productive study environment.

Integrity of Academic Work:

UPI students are expected to:

Policy Compliance:

- Conduct themselves in accordance with UPI's published policies.
- Submit academic work free of plagiarism of any kind including use of artificial intelligence or collusion.
- Actively participate in the learning process.

Resource Awareness:

Be familiar with resources available for academic assistance and avoiding plagiarism.

Copyright Compliance:

Comply with the proper use of copyright materials.

Attendance and Timeliness:

Attend scheduled course activities and submit assessment tasks on time, barring unforeseen or exceptional circumstances.

Equity and Respect

UPI students are expected to:

Interpersonal Conduct:

Treat all staff and students with courtesy, tolerance, and respect.

Non-discrimination:

Respect the rights of others to be treated equitably, free of unlawful discrimination and harassment, including sexual harassment.

Freedom of Expression:

Respect the rights of others to express views and opinions without engaging in offensive behavior.

Lawful and Non-discriminatory Behavior:

Avoid engaging in behavior that is unlawful, discriminatory, or offensive.

Non-threatening Behavior:

Avoid engaging in behavior perceived as threatening or intimidating.

Conduct in a Support Centre (Study Centre)

In the event of blended learning activities, students are expected to:

Respectful Behavior:

- Demonstrate respect for staff and students in support Centers.
- Turn off mobile phones during class times and assessments.

Language and Environment:

- Speak in English at all times.
- Refrain from eating and drinking in classrooms.

Preparation and Sobriety:

- Undertake all required preparation for classes.

- Not participate in any learning activity under the influence of alcohol or other drugs.

Investigation of Misconduct

Any breaches of the code of conduct may be considered misconduct. Institution reserves the right to investigate and determine the seriousness of reported breaches. Serious breaches may result in the cancellation of a student's enrollment.

Other student obligations

Guide to Referencing

When writing assignments, referencing is crucial for various reasons:

1. Acknowledgment and Credit:

Give credit to authors for their work, words, and ideas. Acknowledge the intellectual contributions of others.

2. Locating References:

Allow readers and markers to easily locate your references.

3. Avoid Plagiarism:

Prevent plagiarism by clearly attributing sources.

4. Demonstrate Skills:

Showcase research, reading, and evaluative skills. Provide evidence of the depth and breadth of your knowledge.

5. Academic Integrity:

Avoid losing marks due to improper citation.

6. Consistency:

Maintain consistency in your referencing style.

Course Retake Policy

Students who earn grades below 70% and fail a course may submit a petition for a repeat attempt to the administrative team. This process ensures students understand the importance of mastering course content and the procedures required for course repetition. The administrative team will evaluate the petition, and this may involve seeking the consent of the course instructor, highlighting the application of institutional policies and protocols. Upon approval, students may repeat the course once to demonstrate a higher level of mastery,

encouraging them to analyze their previous performance, identify areas for improvement, and apply enhanced learning strategies in their second attempt.

The grade from the repeated course will be included in the student's transcript, regardless of whether it is higher or lower than the original grade, ensuring a fair assessment of the student's current level of understanding and mastery of the subject matter. If the student achieves a passing grade in the repeated course, they will earn credit for the course, with the original course grade being excluded from the final credit consideration. This demonstrates the student's ability to create a successful learning outcome through perseverance and improved comprehension.

Referencing System

The Harvard referencing system is commonly used and involves a two-stage process:

In-text Reference:

Reference sources within the text of your report or assignment.

Reference List:

Provide a comprehensive list of all references at the end of your report or assignment.

Online Resources for Referencing:

Utilize the following websites to assist you in implementing the Harvard referencing system:

- Cite This For Me - Harvard Referencing
- Harvard Generator
- Purdue Owl