BIOL 1450 INTRODUCTION TO CELL AND MOLECULAR BIOLOGY (4 credit hours)

Elmira College

SPRING 2025

Required Text:
Essential Cell Biology, Alberts et al., fifth edition.

Pre-requisites: .

Course Description

Cell Biology is a foundational course that explores the intricate structures and functions of prokaryotic and eukaryotic cells. Students will delve into the synthesis and roles of macromolecules such as DNA, RNA, and proteins, the regulation of gene expression, membrane dynamics, organelle function, bioenergetics, and cellular communication. Laboratory sessions will complement theoretical knowledge with practical exercises and introduce techniques commonly used in cell and molecular biology research.

Course Objectives and Goals

- Explain the structure and function of prokaryotic and eukaryotic cells.
- Describe the synthesis and roles of DNA, RNA, and proteins within the cell.
- Analyze mechanisms governing gene expression and regulation.
- Evaluate the structure and function of cell membranes and organelles.
- Discuss the principles of bioenergetics and cellular metabolism.

Evaluation of Performance

Your grade will be based upon your performance on exams, assignments, and participation.

6 Labs and Reports	30%
2 Quizzes	20%
Midterm Exam	20%
Final Exam	30%
Total	100%

Grades will be assigned as follows:

A	93% and above	B-	80 - 82%	D+	67 - 69%
A-	90 - 92%	C+	77 - 79%	D	63 - 66%
B+	87 - 89%	C	73 - 76%	D-	60 - 62%
B	83 - 86%	C-	70 - 72%	F	59% or below

Withdrawal Policy: Please see Elmira College Bulletin for information on this policy.

Academic Honesty: Please read the section on Academic Honesty in the **Code of Conduct**. Briefly, academic dishonesty includes: cheating, fabrication, facilitating academic dishonesty, and plagiarism. Ask if you have any questions on whether something constitutes as academic dishonesty. All work must be original and new. Past assignments from current or other courses will not be accepted. Academic dishonesty will not be tolerated. It will result in zero on the assignment, and a report will be filed with the school. Continued practice will result in failure of the class. Institutional penalties may also apply with repeated acts of academic honesty.

Student Responsibility:

- It is your responsibility to keep track of assignments and due dates.
- You should ask questions concerning assignments and lectures, if you need any clarifications.
- If you are struggling in class, have concerns, and/or unsure about expectations, please stop by during office hours or make an appointment for another time.

Tentative Schedule of Topics

Topic	Materials	Tasks & Evaluations
Cells: The Fundamental Units of Life	Chapter 1	
Chemical Components of Cells Lab #1	Chapter 2	Lab Report #1
Energy, Catalysis, and Biosynthesis	Chapter 3	
Protein Structure and Function Lab #2	Chapter 4	Lab Report #2
DNA and Chromosomes	Chapter 5	Quiz #1
DNA Replication and Repair Lab #3	Chapter 6	Lab Report #3
From DNA to Protein: How Cells Read the Genome	Chapter 7	
Control of Gene Expression	Chapter 8	
How Genes and Genomes Evolve	Chapter 9	Midterm Exam
Analyzing the Structure and Function of Genes	Chapter 10	
Membrane Structure Lab #4	Chapter 11	Lab Report #4
Transport Across Cell Membranes	Chapter 12	
How Cells Obtain Energy from Food Lab #5	Chapter 13	Lab Report #5
Energy Generation in Mitochondria and Chloroplasts	Chapter 14	Quiz 2
Intracellular Compartments and Protein Transport Lab #6	Chapter 15	Lab Report #6
Cell Signaling	Chapter 16	
Cytoskeleton	Chapter 17	
The Cell-Division Cycle	Chapter 18	Final Exam