

# BIOL 124: MOLECULAR AND CELLULAR BIOLOGY

## Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2024
Credits:	5
Total Contact Hours:	126
Lecture Hours :	72
Lab Hours:	54
Hours Arranged:	0
Outside of Class Hours:	144
Total Student Learning Hours:	270
Prerequisite:	Intermediate algebra or higher or direct placement based on multiple measures.
District General Education:	B1. Natural Sciences - Life Sciences, B3. Natural Sciences - Laboratory
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter

## Catalog Course Description

A principles of biology course designed for biology majors and pre-med. students. Detailed study of basic structure and function of living material, with emphasis on cell and molecular biology, genetic mechanisms and their control, reproduction and development, evolution. 72 lecture hours, 54 lab hours.

## Course Objectives

- describe in depth the basic processes common to all living forms, with particular emphasis upon cell energetic, exchanges with the cellular and external environments, and genetic mechanisms
- follow experimental procedures, and gather, analyze and present data in an organized, meaningful manner
- integrate life processes throughout the different levels of organization: atomic-molecular through ecosystems and the biosphere
- describe in depth the structural detail of cells and organisms, and to analyze the relationship of this structure to normal function
- describe the relationships of organisms to their environments and to apply biological principles in predicting environmental impacts
- compare processes of reproduction and development in representative groups of organisms
- compare major organ systems in representative organisms
- demonstrate a thorough understanding of the basic biological principles important for success in more advanced biology courses
- explain advances in biotechnology and their biological applications and contributions to society
- demonstrate an ability to use equipment commonly available in a teaching biological laboratory

## Major Course Content

1. History of Science
2. Scientific Method
3. Chemistry (atoms, molecules, properties of water, biochemistry)
4. Cell structure and function
5. Membrane structure and function
6. Thermodynamics and enzyme function
7. Cellular energetics (photosynthesis and respiration)
8. Cell division (mitosis and meiosis)
9. Cell Communication
10. Genetics (Mendelian and chromosomal inheritance and population genetics)
11. DNA replication
12. Protein Synthesis
13. Natural selection and evolution and speciation
14. Biotechnology

## Lab Content

1. Measurements: metric system, volume, linear, weight measures, statistical analysis of data
2. Scientific Inquiry and Experimental Design: Experiment Design, Scientific Literature and Scientific Writing" after Techniques: pipetting, chromatography, electrophoresis, spectrometry
3. Techniques: pipetting, chromatography, electrophoresis, spectrometry
4. Biological Molecules and Cell Structures and Their Functions (prokaryotic/eukaryotic; histology)
5. Cell structure: prokaryotic/eukaryotic; histology
6. Enzyme function
7. Energetics: photosynthesis and metabolism
8. Cell division
9. Genetics
10. DNA analysis
11. Applications of the principles of classical and molecular genetics to problems in genetics and Biotechnology

## Suggested Reading Other Than Required Textbook

Reading the required textbook as recommended in the course schedule.

## Examples of Required Writing Assignments

Lab notebooks and research project poster presentations are required each semester. There are also written responses required on exams and quizzes. Example: Students are required to record their weekly research project results and use those results over seven weeks to prepare a traditional poster presentation that has an introduction, results and discussion section as well as figures and analysis about their lab experiments. They must create a reference citation section and use APA reference guidelines in the body of the paper.

## Examples of Outside Assignments

Students are required to present a 10 minute presentation on a topic selected at the beginning of the semester. The presentation must be

supported with either PowerPoint or html. The student must account for the reliability of sources that they accessed to prepare and the relevance to our class and to biology as a field.

Students are required to look up and review primary research articles related to course concepts and make either oral or written presentations on the articles.

Students are required to complete practice questions using on-line resources that accompany the textbook.

## **Instruction Type(s)**

Lab, Lecture, Online Education Lab, Online Education Lecture

## **IGETC Area 5: Physical and Biological Sciences**

5C. Science Laboratory, 5B. Biological Science