BIO 2.1 Course Outline as of Fall 2007

CATALOG INFORMATION

Dept and Nbr: BIO 2.1 Title: FUND BIO: CELL
Full Title: Fundamentals of Biology (Cell and Molecular)
Last Reviewed: 8/14/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	5.00	Lab Scheduled	6.00	6	Lab Scheduled	105.00
		Contact DHR	0		Contact DHR	0
		Contact Total	9.00		Contact Total	157.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 262.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	BIO 3

Catalog Description:
Cell structure and function, biochemistry, metabolism, molecular genetics, cell differentation. Intended for students majoring in biological sciences, pre-medical or related pre-professional programs. (Formerly BIO 1.3, BIO 3)

Prerequisites/Corequisites:
Completion of CHEM 1A or higher (V6) and Course Completion of BIO 10

Recommended Preparation:
Eligibility for ENGL 1A.

Limits on Enrollment:

Schedule of Classes Information:
Description: Cell structure and function, biochemistry, metabolism, molecular genetics, cell differentiation. Intended for students majoring in biological sciences, pre-medical or related pre-professional programs. (Grade Only)
Prerequisites/Corequisites: Completion of CHEM 1A or higher (V6) and Course Completion of BIO 10
Recommended: Eligibility for ENGL 1A.

Limits on Enrollment:
Transfer Credit: CSU;UC. (CAN BIOL2)(BIO 2.3+BIO 2.2+BIO 2.1=BIOL SEQ A)
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 2025	
	L5	Physical and Biological Sciences		
	C	Natural Sciences	Fall 1981	Fall 2025
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B2	Life Science	Fall 1981	
	B3	Laboratory Activity		
IGETC:	**Transfer Area**		Effective:	Inactive:
	5B	Biological Sciences	Fall 1981	
	5C	Fulfills Lab Requirement		

CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:
UC Transfer:	Transferable	Effective:	Fall 1981	Inactive:

CID:
CID Descriptor: BIOL 190 Cell and Molecular Biology
SRJC Equivalent Course(s): BIO2.1

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Outcomes and Objectives:
Upon completion of the course, students will be able to:
1. Use the scientific method to develop and test hypotheses.
2. Explain current hypotheses on the diversity and origins of cellular life.
3. Differentiate the structure and function of prokaryotic and eukaryotic cells.
4. Relate the properties of biochemical macromolecules to the structure and function of cell membranes and organelles.
5. Compare and contrast the mechanisms of cell respiration and photosynthesis.
6. Describe the transmission of genetic information through sexual and asexual reproduction.
7. Explain the molecular flow of information from DNA to RNA to protein.
8. Explain cell regulation based on the operon model and allosteric proteins.
9. Relate information on cell and protein structure to specialized cell functions.
10. Use the microscope proficiently and perform a variety of standard laboratory techniques used for the study of cells, DNA and proteins.

Topics and Scope:

I. Introduction to biology
- A. Characteristics of life
- B. Biological levels of organization
- C. Disciplines of biology
- D. Scientific method
- E. Evolution and biological thought
- F. Cell theory and origins of cells

II. The chemistry of life
- A. Atoms and molecules
- B. Water and carbon
- C. Biochemistry
- D. Chemical reactions

III. Cell structure and function
- A. Cell theory
- B. Origin and diversity of cells
- C. Prokaryotic vs. eukaryotic cells
- D. Cytoskeleton and organelles
- E. Cell membranes and transport
- F. Bioenergetics and enzymes

IV. Energy flow in cells
- A. Cell respiration reactions
- B. Photosynthesis reactions

V. Information flow in cells
- A. Cell reproduction: mitosis and meiosis
- B. Inheritance: genes and chromosomes
- C. Mendelian genetics
  1. Monohybrid crosses
  2. Dihybrid crosses
  3. Probability theory
- D. Structure, replication and repair of DNA
- E. Transcription and translation
- F. Genetic regulation: operon and allosteric proteins

VI. Cell specialization
- A. Cellular movement: motility and contraction
- B. Cell signaling: receptors and potentials
- C. Immune function
- D. Development

VII. Laboratory exercises
- A. Molecular model building
- B. Microscopy and cell structure
- C. Statistical analysis of data: chi square and probability theory
- D. Enzyme kinetics
- E. Cell fractionation
- F. Osmosis
- G. Mitosis and meiosis
- H. Photosynthesis and respiration
- I. DNA extraction
- J. Cell culture
- K. Electrophoresis

L. Antibiotic resistance
M. PCR (polymerase chain reaction)

Assignment:

1. Weekly reading in text, 30-60 pages per week.
2. Lab reports: may include calculation, graphing and data analysis, 2-4/ semester.
3. Research paper may be required, 5-10 pages long, includes library research.
4. Formal assessment: 3 to 4 midterm exams and a comprehensive final exam including objective and essay questions, 3 to 4 lab practical examinations, quizzes may be required.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Research paper	Writing 10 - 30%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab reports	Problem solving 15 - 35%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, Completion, Essay questions	Exams 40 - 75%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Biology, Campbell and Reece, 7th edition, 2005
World of the Cell (6th Edition) by Wayne M. Becker, Lewis J. Kleinsmith, Jeff Hardin 2005
Asking About Cells, A J Tobin and R E Morel, 1997