

JAMESTOWN COMMUNITY COLLEGE
State University of New York

INSTITUTIONAL COURSE SYLLABUS

Course Title: Cell Biology

Course Abbreviation and Number: BIO 2800

Credit Hours: 4

Course Type: Lecture/Lab

Course Description: This course examines the structure and function of living cells. The course extends and adds to the fundamental cell biology knowledge students acquire in BIO 1570, Principles of Biology I. In the lecture component of the course, students will learn about energy use by cells; cellular proteins and enzymes; DNA, chromosomes, and gene expression; membrane structure and transport; cellular organelles; cell communication; the cytoskeleton; and control of the cell cycle and cell death. In the laboratory portion of the course, students will learn how to perform contemporary methods used to manipulate cells and molecules within cells.

Prerequisite: ENG 1510 and BIO 1570; Prerequisite / Corequisite: CHE 1550 or higher.

General Education Requirements Met

SUNY

Natural Sciences

JCC

Applied Learning

Scientific Reasoning

Student Learning Outcomes:

Students who demonstrate understanding can:

1. Demonstrate an understanding of the methods scientists use to explore natural phenomena, including observation, hypotheses development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling. [SUNY Gen Ed – Natural Sciences]
 2. Application of scientific data, concepts, and models in one of the natural sciences. [SUNY Gen Ed – Natural Sciences]
 3. Recognize the importance of ethical behavior in fostering a community of mutual respect and dignity.
 4. Effectively apply knowledge and skills to a real-world experience, creative project, or independent intellectual investigation. [JCC Gen Ed – Applied Learning]
 5. Thoughtfully reflect on connections between concepts studies in the classroom & insights gained from an applied learning experience/project. [JCC Gen Ed – Applied Learning]
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Topics Covered:

- How prokaryotes and eukaryotes differ in their cellular architecture, the architecture of their genomes and in gene expression.
 - The structure of the cytoskeleton and extracellular matrix and how cells use these to achieve their function.
 - Structure Function Relationships of Complex Biomolecules, including the basic biochemistry of their function.
 - Basic enzymology as it relates to structure function relationships
 - How the Central Paradigm of Biology is modified by the idea of a genome, proteome and a kinome, etc.
 - The basic architecture of eukaryotic cells in general and how this is used to achieve two important outcomes, proteins synthesis and ATP synthesis.
 - How gene expression is regulated from using modern ideas of the molecular biology of eukaryotic cells.
 - How cells transport proteins within them and the idea of vesicular transport and motor proteins
 - Fluid Mosaic Model and lipid rafts
 - Membrane receptors and cytoplasmic receptors
 - Signal transduction mechanisms
 - Receptor mediated endocytosis, phagocytosis and pinocytosis
 - ATP synthesis in eukaryotic and prokaryotic cells
 - How different types of cells are organized to achieve function, and how this architecture relates their function.
 - How cells die by apoptosis including internal and external stimuli that cause apoptosis.
 - How cell division is regulated.
 - What is cancer, including the multiple hit hypothesis and other important ideas of cancer biology.
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Information for Students

- Expectations of Students
 - [Civility Statement](#)
 - [Student Responsibility Statement](#)
 - [Academic Integrity Statement](#)
- [Accessibility Services](#)
 Students who require accommodations to complete the requirements and expectations of this course because of a disability must make their accommodation requests to the Accessibility Services Coordinator.
- [Get Help: JCC & Community Resources](#)
- [Emergency Closing Procedures](#)
- Course grade is determined by the instructor based on a combination of factors, including but not limited to, homework, quizzes, exams, projects, and participation. Final course grade can be translated into a grade point value according to the following:

A=4.0	B+=3.5	B=3	C+=2.5	C=2	D+=1.5	D=1	F=0
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- Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, VA appointments) are welcome and encouraged to communicate these to the instructor.

Effective Date: Fall 2023