



## Syllabus

### BIO 222 - Cell Biology

#### General Information

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**Date** February 7th, 2013

**Department** Science and Technology

**Course Prefix** BIO

**Course Number** 222

**Course Title** Cell Biology

#### Course Information

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**Catalog Description** This course is designed to provide students with an intense study of cell structure and function. A wide range of topics will be covered and will include: biochemistry, membrane structure and function, organelle structure and function, the cell cycle and cancer, necrosis and apoptosis, cell signaling, and the cellular basis of tissue structure.

**Credit Hours** 3

**Lecture Contact Hours** 3

**Lab Contact Hours** 0

**Other Contact Hours** 1

**Grading Scheme** Letter

#### Prerequisites

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None

#### Co-requisites

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None

#### First Year Experience/Capstone Designation

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**This course DOES NOT satisfy the outcomes applicable for status as a FYE or Capstone.**

## **SUNY General Education**

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**This course is designated as satisfying a requirement in the following SUNY Gen Ed category**

None

## **FLCC Values**

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**Institutional Learning Outcomes Addressed by the Course**

None

## **Course Learning Outcomes**

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### **Course Learning Outcomes**

1. Students will be able to identify, describe, and explain the molecular action of a pharmaceutical drug
2. Students will be able to critically analyze scientific literature in the field of cell biology
3. Students will be able to discuss complex scientific information in a group setting and will be able to lead portions of the discussion
4. Students will be able to identify and explain current experimental methods used in cell biology research

## **Outline of Topics Covered**

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### I. Introduction to Cell Biology

- A. History and discovery
- B. Microscopy
- C. Basic cell structure
- D. Cell diversity

### II. Cell chemistry

- A. Inorganic cell chemistry
- B. Chemical bonds
- C. Organic molecules and cell chemistry
- D. Ions and membrane potential

### III. Cell energetics

- A. Enzyme reactions and activated carrier molecules
- B. Reaction energetics
- C. Glycolysis and fermentation
- D. Citric Acid Cycle
- E. Electron Transport Chain

#### IV. Protein structure and function

- A. Protein structure and shape
- B. Protein-protein interactions
- C. Role of proteins in cell function

#### V. DNA and genetics

- A. DNA Structure and function
- B. DNA replication and repair
- C. Transcription and transcription factors.
- D. Post transcriptional modifications
- E. Translation

#### VI. Membrane structure and function

- A. Lipid bilayer chemistry
- B. Membrane proteins
  - 1. Carrier proteins
  - 2. Ion channels
- C. Membrane potential
- D. Action potential

#### VII. Intracellular compartments and protein transport

- A. Membrane bound organelles
- B. Protein sorting
- C. Vesicular transport and membrane fusion
- D. Secretory Pathways
- E. Endocytic pathways

#### VIII. Cell signaling

- A. Principles of cell signaling
- B. G-protein linked receptors
- C. Enzyme linked receptors
- D. Adhesion proteins and extracellular matrix

#### IX. The cell cycle

- A. Overview of the cell cycle
- B. Cell cycle control system
- C. Control of cell numbers
- D. Cell cycle and cancer
- E. Apoptosis

#### X. Tissues

- A. The extracellular matrix
- B. Epithelial tissues and cell-cell junctions
- C. Tissue maintenance, repair and renewal
- D. Tissue development
- E. Tissue engineering and biotechnology