BIOL 141: Foundations of Biology: Cells, Energy and Organisms

This detailed course description provides information about course topics & content. It is not a course syllabus. Summer course syllabi are updated in the spring, and may not be available until summer classes begin.

Instructor Information

Instructor	Email	Course Format	Number of Credits
Valerie Olmo	valolmo@umbc.edu	Lecture, Discussion	4

General Information

Delivery Format: In-Person

Prerequisite /Co-requisite: NA

Course Materials

Currently Used Materials

- Freeman, Scott 2011. Biological Science, 4th edition. Pearson/Benjamin Cummings Publishing Company, San Francisco.

Course Objectives/Learning Outcomes:

Course Learning Outcomes

Students who complete Biology 141 should be able to:

I. Identify and distinguish between the structure of a "typical" plant, animal, and bacterial cell.
   A. List the names and functions of each of the structures (organelles) within a cell.
   B. Describe ways in which organelles work together to accomplish cellular functions.
   C. Describe the composition, function and selective permeability of cell membranes.

II. Apply the principles of metabolism to the processes of cellular energetics.
   A. Identify the basic properties of enzymes and describe their function and regulation.
   B. Explain the fundamentals of cellular respiration and photosynthesis.
   C. Describe the role of enzymes in the processes of photosynthesis and in cellular energy harvesting pathways.

III. Describe the fundamental processes involved in cell division.
   A. Describe mitosis and meiosis.
   B. Explain molecular mechanisms by which the cell cycle is regulated.

IV. Describe the "Central Dogma of Molecular Biology":
   A. Identify/recall the structure of DNA and RNA.
   B. Describe the processes of DNA replication, transcription, and translation.

C. List/describe the basic characteristics of the genetic code.

V. Plant Physiology
   A. Describe the structure of the vascular plant body
   B. Describe the importance of hormones in plant physiology
   C. Explain the fundamentals of plant reproduction

VI. Animal Physiology
   A. Explain the structure and function of the human digestive system.
   B. Explain how/where digestive enzymes and hormones function in human digestion.
   C. Describe how electrical signals are transmitted by neurons.

Potential Topics Covered Summer 2014:

WEEK	DATE	TOPIC
Week 1	May 28-May 30	Introduction, Cell Theory and Evolution
		UNIT I. Cellular Organization and Energetics
		A. Cell Organization
		-Membrane Biology
		-Cell Structure/Function
		B. Cellular Energetics
		-Energy and Enzymes
Week 2	June 2-6	-Cellular Respiration
		-Photosynthesis
		UNIT II. Inheritance, DNA, and Central Dogma
		A. Inheritance
		-Mitosis and the Cell Cycle/Meiosis
Week 3	June 9-13	-Mitosis/Meiosis (continued)
		B. Modern Genetics
		-DNA and the Gene
		-DNA Synthesis and Repair
Week 4	June 16-20	-Genetic Code and the Central Dogma
		-Transcription, Translation, Mutation
		-Regulation of Gene Expression in Bacteria
Week 5	June 23-27	UNIT III. Plant Physiology
		-Plant Growth, Reproduction, Life Cycle
		-Chemical Signals in Plants
		UNIT IV. Animal Physiology
		-Digestive System
		-Nerve Cells and the Nervous System
Week 6	June 30- July 2	Review & Final Exam

Additional Information and Resources