

BIOLOGY 311C

INTRODUCTORY BIOLOGY I

Introduction to structure & function, energy flow, and the transmission & expression of genetic information in living systems.



BIG IDEA I

STRUCTURE RELATES TO FUNCTION

- 1 Biological Hierarchy:** Biological systems are structured at many interrelated levels.
- 2 Chemistry for Biology:** The structure and properties of chemicals determine the behavior and functions of molecules in organisms.
- 3 Biological Molecules:** Cell components and cells are made up of biological molecules with specific chemical properties.
- 4 Origin of Life:** The first living cells originated by chemical evolution in pre-biotic Earth.
- 5 Cell Structure:** The structure of cells has evolved to perform a variety of essential functions.
- 6 Biological Membrane:** Cell membranes are selectively permeable barriers.
- 7 Cell Communication:** Cells communicate with each other and can convert environmental signals to complex integrated responses within a cell.



BIG IDEA II

ENERGY IS TRANSFORMED TO SUSTAIN LIVING SYSTEMS

- 8 Metabolism:** Energy transfer and transformation is critical to all aspects of biology from cells to ecosystems.
- 9 Respiration:** Organic molecules are broken down in cellular respiration to make ATP.
- 10 Photosynthesis:** Light energy is harnessed into chemical bond energy of organic molecules in photosynthesis.



BIG IDEA III

GENETIC INFORMATION IS EXPRESSED AND TRANSMITTED

- 11 DNA Structure & Replication:** DNA is the molecule of heredity in all organisms.
- 12 Transcription & Translation:** Genetic information flows from DNA to RNA to protein.
- 13 Gene Regulation:** Cells can regulate gene expression at many points during the process.
- 14 Recombinant DNA:** Scientists utilize knowledge of gene structure and regulation to express modified genes.
- 15 Cell Cycle:** Mitosis is essential for growth, development and reproduction of somatic cells.
- 16 Meiosis:** Meiotic cell division leads to gamete formation, generates genetic variability and transmits alleles from one generation to the next.

CORE COMPETENCIES

A

Engage in the process of science by practicing observation, generating hypotheses, designing testable experiments and manipulating data

B

Manipulate numerical data and evaluate the significance of the data using appropriate mathematical and/or statistical methods

C

Use logical reasoning to apply known concepts to novel situations and to identify and evaluate source materials and scholarly literature

D

Demonstrate personal responsibility to set goals and regularly engage in self-assessment of progress toward academic accomplishment

E

Collaborate, discuss, and exchange ideas in a team setting in order to explore creative solutions to complex problems

F

Apply biological concepts to daily life and issues in society