

# **Molecular and Cellular Biology**

## **I. The Scientific Method As Applied to Biological Investigations**

- A. Presentation of experimental design concepts.
- B. Development of the scientific process which leads to testing of hypotheses.
- C. Experimental design and incorporation of controls.

## **II. Chemical Context of Life**

- A. The chemical features of atoms and molecules.
- B. The structure and function of the major classes of biological molecules (large: lipids, phospholipids and steroids, and macromolecules: nucleic acids, proteins and polysaccharides ).
- C. Interplay of biomolecules within biosystems.

## **III. The Biology of Archaea, Bacteria and Eukaryotes**

- A. The history, structure and function of cells and cellular components.
- B. The signaling and interactions between intracellular organelles.
- C. Signaling processing within cells.
- D. Signaling processes between cells.
- E. Replication of Prokaryotic and Eukaryotic cells: fission, mitosis and meiosis.

## **IV. Genetic Systems and Their Expression**

- A. Classical and modern concepts of heritability.
- B. Process of replication.
- C. Processes of transcription and translation.
- D. Regulation of phenotypic and functional expression of genetic information.
- E. Molecular basis of evolution.

# **Organismic Biology**

## **I. The Scientific Method As Applied to Biological Investigations**

- A. Presentation of experimental design concepts.
- B. Development of the scientific process which leads to testing of hypotheses.
- C. Experimental design and incorporation of controls.

## **II. Transmission Genetics**

- A. Mitosis/Meiosis.
- B. Mendelian genetics.
- C. Non-Mendelian genetics.
- D. Pedigrees and genetic diseases.

## **III. Evolutionary Processes**

- A. The history of evolutionary thought.
- B. Microevolution and macroevolution.
- C. Speciation.

## **IV. Survey of Biodiversity**

- A. The history of life on earth.
- B. The diversity of life across the principal groups of organisms.
- C. Comparative analysis of form and function.

## **V. Ecology**

- A. Interactions between organisms and their environment.
- B. Population and community ecology.
- C. Ecosystem structure and function.
- D. Human ecology.