

Course Abstract

If you need accommodations due to a disability, contact Disability Services in Edison Hall Room 100, 732.906.2546.

To foster a productive learning environment, the College requires that all students adhere to the Code of Student Conduct which is published in the college catalog and website.

Course ID and Name: BIO 117 Biology I

Department: Natural Sciences

Chairperson: Dr. Donna Howell
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Prerequisites: Appropriate score on the College's Placement Test or MAT 013 and one year of high school laboratory science or BIO 010 or CHM 010

Co-requisites: none

Course Description: A general study of the physical and chemical properties of living material, cell organelles, cell transport, cell division, energy transformations in photosynthesis and cellular respiration, plant and animal tissues, the classification of organisms and genetics.

General Education Status: Science

Credits: 4

Lecture Hours: 3

Lab Hours: 3

Learning Outcomes:

Upon successful completion of the course, students will be able to

1. explain the elements of the scientific method including formulating hypotheses, designing experiments, presenting data and analyzing data.
2. demonstrate fluency in the language of life sciences by correctly defining and using biological terms.
3. explain and apply cellular and molecular biological concepts.
4. demonstrate proficiency in basic laboratory techniques and safety.
5. describe the historical value of science and recognize the tentative nature of biological theories.

Course Content Areas:

Introduction: History of biology, branches of biology.

Characteristics of Life: Structure, metabolism, irritability, movement, reproduction, adaptation, behavior, homeostasis, growth, evolution.

Levels of Organization: Subatomic particles, atoms, cells, tissues, organs, organ systems, organisms, populations, communities, ecosystems, biosphere.

Scientific Method: Observation, hypothesis development and testing, dependent, independent and control variables, data collection and presentation, form conclusions, define theories and laws.

Principles of Chemistry: Elements, atoms, protons, neutrons, electrons, Atomic Number, Atomic Mass, isotopes, electron energy levels, chemical bonding.

Properties of Water: Chemical bonding, surface tension, capillarity, high specific heat, high heat of vaporization, properties of ice, solvent properties.

Organic Molecules: Carbohydrates, monosaccharides, disaccharides, polysaccharides, isomers, lipids, fats, triglycerides, steroids, phospholipids, waxes, proteins, amino acids, peptide bonds, levels of organization, denaturation, specificity, nucleic acids, DNA, RNA, nucleotides, double helix.

Cell Structure and Function: Cell theory, prokaryotic, eukaryotic, nucleus, nucleolus, cytoplasm and organelles, cell membrane and transport.

Tissue Types: Animal tissue types, epithelial, connective, muscle, nervous, organs and organ systems, plant tissue types.

Cellular Reproduction: Chromosomes, chromatids, cell cycle, mitosis, cytokinesis, meiosis, gametogenesis, diploid, haploid, homologous pair.

Mendelian Genetics: Dominant, recessive, phenotype, genotype, allele, blending, homozygous, heterozygous, segregation, independent assortment, monohybrid and dihybrid crosses.

Molecular Genetics: Structure of DNA and RNA structure, transcription, translation, mutations, Biotechnology, gene products, social implications.

Energy: Energy conversion, ATP, cellular respiration, glycolysis, Krebs cycle, electron transport, chemiosmosis, role of oxygen, fermentation.

Diversity: Taxonomy, basis for classification historical developments, criteria used for classification.