

Biotechnology 1

This course provides exploratory experience combining laboratory and real-life applications in the field of biotechnology. Topics include:

- Pathways in Biotechnology careers Medical/ Pharmaceutical, agriculture, industrial/environmental and research
- Matter, energy, chemical processes of cells, organisms
- Solution concentrations, and making stock solutions.
- Cell molecular structure and function, membranes, DNA, plasmids, reproduction, communication
- Fundamentals of biochemistry, characteristics of DNA protein synthesis, germ theory,
- Molecular genetics and biotechnology, restriction digest, DNA analysis, PCR
- Levels of organization, molecular to organismal, classification, and taxonomy
- Genetic diversity, selection, adaptations, and changes through time
- Bioethics

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students learn to use micro pipet, centrifuge, laminar flow hoods, pH meters and other standard laboratory equipment. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 40% of classroom time will be dedicated to laboratory experiences.

Biotechnology 2

This course provides exploratory experience combining laboratory and real-life applications in the field of biotechnology. The content includes,

- Recombinant Biotechnology applications.
- Chemical processes in biotechnology, pH, solutions, molarity
- Cell propagation, growth and cultures for biotechnology
- Biochemistry, proteins, enzymes, plasmids, recombinants, blood borne pathogens
- Genetics and biotechnology, gene selection, transformation, analysis
- Structure and function of various organisms used as genetic models
- Interdependence of organisms, humans, and the environment,
- Genetic diversity and selection
- Connection between biotechnology, agricultural, food, and medicine and careers
- Bioethics

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will conduct laboratory explorations in genetic engineering, extraction of DNA and use of PCR and electrophoresis units. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 40% of classroom time will be dedicated to laboratory experiences.

Biotechnology 3

Biotechnology 3 is a course designed to provide students with intense laboratory and research skills in preparation for continued education and/or entry into the biotechnology industry. Students will build upon the skills attained in Biotechnology 1 and Biotechnology 2 as they design and conduct experiments relevant to current biotechnology. A close association with local industry and postsecondary institutions will provide additional opportunities for development and application of biotechnology practices.