

BIOTECHNOLOGY (BIOTECH)

Biotechnology (BIOTECH) 201

Survey of Biotechnology

This course will serve to introduce students to modern biotechnology which is based on recent developments in molecular biology, especially those in genetic engineering and bioengineering. Students will explore the diversity of the field focusing on such areas as medicine, biohazard, bioremediation, biocatalysis, biosafety, agriculture, forensics, quality control and assurance, testing, regulation, law and policy, intellectual property, proteomics, pharmacogenomics, nutrition, and product development. This course will incorporate speakers that are representative of specific areas in biotechnology. Writing assignments, as appropriate to the discipline, are part of the course.

Admittance into the Biotechnology program.

2 Lecture hours. 2 Credit Hours.

Offered At: HW, TR

Biotechnology (BIOTECH) 211

Laboratory Math for Biotechnology

This course introduces mathematical tools that are used in the biotechnology laboratory. Students apply mathematical concepts to solve problems such as calculating quantities of chemicals required to make solutions, graphing and interpreting data, and calibrating instruments. Basic statistical and algebraic concepts are covered. Writing assignments, as appropriate to the discipline, are part of the course.

Admittance into the Biotechnology program.

2 Lecture hours. 2 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 212

Basic Laboratory Skills and Safety

This course covers basic concepts and techniques necessary to work effectively in a biotechnology lab. The importance of quality regulations and standards and the role of the technician in producing quality results are emphasized. Laboratory math is introduced and applied. Students learn basic techniques including measuring, weighing, mixing solutions, following, and writing procedures, keeping records, making observations, and using instrument manuals and catalogues. Principles of metrology (measurement) are introduced and students practice using, calibrating, and verifying the performance of instruments. Students survey potential laboratory hazards and safety procedures. The course covers regulation of chemicals: flammable, reactive, corrosive, and toxic substances. Writing assignments, as appropriate to the discipline, are part of the course.

Admittance into the Biotechnology program.

4 Laboratory hours. 1 Lecture hours. 3 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 220

Cell Culture Laboratory

Covers the basic techniques of plant and animal cell culture. Plant unit includes media preparation isolation of explants and establishment of callus from suspension cultures, growth factor bioassays, regeneration of whole plants from tissue and plant genetic engineering techniques. Mammalian cell units include media preparation, maintenance of cultured cells, transfection of cultured cells, cloning and ELISA assays and monoclonal antibody production. Writing assignments, as appropriate to the discipline, are part of the course.

Grade of C or better in BIOLOGY 121 and MCRBIO 233

4 Laboratory hours. 1 Lecture hours. 3 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 225

Biotechnology Techniques 1

Introduces students to the basic concepts of spectrophotometry, biomolecular assays and separation techniques. Students' complete lab work using a variety of laboratory methods including paper, thin layer, gas and HPLC chromatography, spectrophotometry, and several biomolecular assays. Students learn to analyze and interpret their results and practice documentation and communication of their results. Writing assignments, as appropriate to the discipline, are part of the course.

Grade of C or better in BIOLOGY 121 and CHEM 203 and BIOTECH 212 or consent of Department Chairperson.

4 Laboratory hours. 1 Lecture hours. 3 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 230

Molecular Biology Techniques

The course covers basic concepts in molecular biology. The course will emphasize "classical" molecular biology techniques (DNA extraction, Gel electrophoresis, restriction enzyme analysis, cloning, Southern blotting and Western blotting). The course will also cover Polymerase Chain Reaction (PCR), bioinformatics, and will explore applications that are used to view and analyze the structure of DNA and proteins. Writing assignments, as appropriate to the discipline, are part of the course.

Grade of C or better in BIOLOGY 121, CHEM 203, and BIOTECH 212 or consent of Department Chairperson.

4 Laboratory hours. 1 Lecture hours. 3 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 235

Biotechnology Techniques 2

This course covers intermediate concepts in molecular biology emphasizing topics that are important in the biotechnology industry. This course will explore cell and gene therapy techniques, biofuels production and production of biopharmaceutical products and devices. Writing assignments, as appropriate to the discipline, are part of the course.

Grade of C or better in BIOTECH 225 and BIOTECH 230 or Consent of Department Chairperson.

4 Laboratory hours. 1 Lecture hours. 3 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 245

Bioinformatics for Biotechnology

This course will cover a range of bioinformatics research and concepts using a case-based and problem-solving approach. This course will consist of a combined lecture and computer laboratory format to provide hands on approach in applying bioinformatics to a variety of research problems include genome analysis, DNA microanalysis, phylogenetics, three-dimensional structure prediction and proteomics. Special attention will be paid to ethical, legal, and personal concerns in the practice of bioinformatics. Writing assignments, as appropriate to the discipline, are part of the course.

Grade of C or better in BIOTECH 225, BIOTECH 230, and CoRequisite CIS 103 (Python) or Consent of Department Chairperson.

4 Laboratory hours. 1 Lecture hours. 3 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 262

Biomanufacturing

The production of biopharmaceutical products by bacteria, yeast, and eukaryotic cell lines constitutes what is referred to as Biomanufacturing. Biomanufacturing of the products is a multi-step process which involves the use of bioreactors, flow cytometers, cell counters and many other instruments. In this course students will learn various biomanufacturing protocols and the theoretical background to analyze their results and problem solve errors that arise. Writing assignments, as appropriate to the discipline, are part of the course. Topical coverage may change based on evolving industry standards and needs.

Grade of C or better in BIOTECH 220 and BIOTECH 230, or Consent of Department Chairperson.

4 Laboratory hours. 2 Lecture hours. 4 Credit Hours.

Offered At: TR

Biotechnology (BIOTECH) 299

Internship in Biotechnology

This course involves a field experience at an off-campus/on-campus site guided by a faculty advisor and a site supervisor (on campus - one faculty member may serve both roles). Sites include industry/company laboratories and university laboratories or on campus and is based on availability.

Grade of C or better in Biotech 201, Biotech 211, Biotech 212, Bio. 121, and Micro. 233 or Consent of Department Chairperson.

19.5 Laboratory hours. 0.5 Lecture hours. 2 Credit Hours.

Offered At: TR