



Biotechnology - Bioprocess Manufacturing Technology (20100)

Course Descriptions

BIO 110 Principles of Biology

Corequisite: DRE 098 or appropriate placement test scores

This course provides a survey of fundamental biological principles for non-science majors. Emphasis is placed on basic chemistry, cell biology, metabolism, genetics, evolution, ecology, diversity, and other related topics. Upon completion, students should be able to demonstrate increased knowledge and better understanding of biology as it applies to everyday life. This course has been approved for transfer under the CAA and ICAA as a universal general education transfer component (UGETC) course in Natural Sciences.

BIO 175 General Microbiology

Prerequisites Take one: BIO 110, BIO 111, BIO 163, BIO 165, or BIO 168

This course covers principles of microbiology with emphasis on microorganisms and human disease. Topics include an overview of microbiology and aspects of medical microbiology, identification and control of pathogens, disease transmission, host resistance, and immunity. Upon completion, students should be able to demonstrate knowledge of microorganisms and the disease process as well as aseptic and sterile techniques. This course has been approved for transfer under the CAA and ICAA as a premajor and/or elective course requirement.

BPM 110 Bioprocess Practices

This course provides a study of plant operations including various plant utility systems and detailed study of the varied plant environments in a bioprocessing facility. Emphasis is placed on quality mindset and principles of validation through applications of monitoring procedures. Upon completion, students should be able to demonstrate the rigors of industry regulation and its necessity.

BPM 111 Bioprocess Measurements

Prerequisites: Take BPM 110

This course covers a variety of physical measurements. Emphasis is placed on pH, temperature, pressure and flow rates, as well as spectrophotometry, and biochemical and chemical analysis methods. Upon completion, students should be able to demonstrate and perform many aspects of process monitoring.

BPM 112 Upstream Processing

Prerequisite: Take BPM 111

This course introduces techniques involved in cell growth and fractionation. Topics include fermentation theory and application, as well as cell harvesting, cell disruption and fractionation methods. Upon completion, students should be able to grow cells, as well as isolate and collect various fractions.

BPM 113 Downstream Bioprocessing

Prerequisites: Take BPM 111

This course introduces a variety of techniques involved in separation procedures. Topics include extraction and precipitation, concentration and molecular filtration methods, as well as different types of chromatography. Upon completion, students should be able to perform separation procedures with an understanding of industrial scale procedures

CHM 131 Introduction to Chemistry

This course introduces the fundamental concepts of inorganic chemistry. Topics include measurement, matter and energy, atomic and molecular structure, nuclear chemistry, stoichiometry, chemical formulas and reactions, chemical bonding, gas laws, solutions, and acids and bases. Upon completion, students should be able to demonstrate a basic understanding of chemistry as it applies to other fields. This course has been approved for transfer under the CAA and ICAA as a general education course in Natural Science.

CHM 131A Introduction to Chemistry Lab

Corequisite: CHM 131

This course is a laboratory to accompany CHM 131. Emphasis is placed on laboratory experiences that enhance materials presented in CHM 131. Upon completion, students should be able to utilize basic laboratory procedures and apply them to chemical principles presented in CHM 131. This course has been approved for transfer under the CAA and ICAA as a general education course in Natural Science.

**ISC 121 Environmental Health and Safety**

This course covers workplace environmental, health, and safety concepts. Emphasis is placed on managing the implementation and enforcement of environmental health and safety regulations and on preventing accidents, injuries, and illnesses. Upon completion, students should be able to demonstrate an understanding of basic concepts of environmental, health, and safety.

ISC 175 QA Fundamentals

This course is designed to increase fundamental knowledge in the philosophies, principles, and practice of quality in the work environment. Topics include the history and basics of quality, philosophies of quality, daily application of principles, and roles of quality professions, with emphasis on cGMP environment. Upon completion, students should be able to discuss quality fundamentals, components of quality systems, and identify standards and programs of quality.

ISC 278 cGMP Quality Systems

This course focuses on the development, implementation, and on-going maintenance of a quality system in a cGMP environment. Topics include the cGMP standard, components of cGMP quality systems, quality function rules and training, and development of documentation such as SOPs and system review procedures. Upon completion, the student should be able to identify the components of a quality system and develop a quality system manual utilizing the cGMP standard.

ISC 280 Validation Fundamentals

This course covers the fundamental concepts of components of a validation program in a cGMP environment. Emphasis is placed on FDA requirements concerning validation, types of validation, documentation, procedures, and the QA role. Upon completion, students should be able to discuss the purpose of validation, identify the steps in the validation process, and effectively utilize sample documentation.

PTC 110 Industrial Environment

This course introduces the pharmaceutical industry, including a broad overview of work in this field. Emphasis is placed on good manufacturing practices (GMP), work conduct, company organization, job expectations, personal safety, hygiene, and company rules and regulations. Upon completion, students should be able to follow good manufacturing practice regulations and inspect a pharmaceutical manufacturing facility for compliance with GMP.

PTC 228 Pharmaceutical Issues

This course provides a forum for discussion of current pharmaceutical topics. Emphasis is placed on events, news, regulations, and technology in pharmaceutical manufacturing. Upon completion, students should be able to demonstrate an understanding of the dynamic nature of the pharmaceutical industry.

PTE 116 Pathway to Employment-Biological/Chemical

This course introduces fundamental employment core skillsets required to effectively enter the biological and chemical workforce and/or a registered apprenticeship and may also serve as a component of a pre-apprenticeship. Topics include workplace safety, communication skills, industry overview, tools and equipment, computation and financial literacy, materials, employability skills, personal health, career exploration and pathways including apprenticeship, job preparation and required job skills, and site visits. Upon completion, students should be able to explain how to locate and engage employers, present themselves in a professional manner, perform basic on-the-job skills, pursue necessary job-specific training and/or certification, and enter a biological and chemical career with the knowledge required to be successfully employed.

WBL 111 Work-Based Learning I

Local Prerequisite: Approval of Instructor or Dpt. Chair

This course provides a work-based learning experience with a college-approved employer in an area related to the student's program of study. Emphasis is placed on integrating classroom learning with related work experience. Upon completion, students should be able to evaluate career selection, demonstrate employability skills, and satisfactorily perform work-related competencies.