

BIOTECHNOLOGY

Department of Biology

Worcester State University offers a program in biotechnology to meet the need for skilled laboratory associates in the experimental laboratory and in manufacturing facilities of the biotechnology industry. Biotechnology graduates are trained in tissue culture, molecular biology, protein purification, analytical chemistry, and regulatory affairs and are eligible for internships. In addition, students may opt for a major in biotechnology with a minor in pre-medicine. Biotechnology majors are not eligible for a Chemistry Minor.

Graduates are qualified for careers in research and development, quality assurance, quality control, and manufacturing as well as for further (graduate) education.

The Biotechnology major is sponsored jointly by the departments of Biology and Chemistry.

- Biotechnology
- Combined BS/MS Program in Biotechnology
- Honors Program in Biotechnology
- Major in Biotechnology and prerequisites for the Accelerated Pharmacy Program with Massachusetts College of Pharmacy and Health Science University
- Major in Biotechnology, Concentration in Bioinformatics
- Major in Biotechnology, Concentration in Pre-Medicine

Faculty

Roger S. Greenwell, Co-Coordinator of the Biotechnology Program, Associate Professor (2014), B.S. Western Kentucky University; Ph.D. University of Wisconsin-Madison

Susan Mitroka-Batsford, Co-Coordinator of the Biotechnology Program, Associate Professor (2013), B.A. Rutgers University; Ph.D. Virginia Polytechnic Institute and State University

Jeffrey C. Nichols, Associate Professor (2006), B.A. Texas Tech University; Ph.D. Rice University

Maura Pavao, Professor (2001), B.S. Worcester Polytechnic Institute; M.S., Ph.D. Rutgers University

Courses

BT-101 Introduction to Forensic Sciences

LASC Categories: NSP, HBS, LAB

Survey of forensic case studies and the laboratory techniques used to solve crimes including microscopy, chromatography, ballistics and DNA analysis.

Every year. 4 Credits

BT-240 Research Experience for Undergraduates

Lab and/or field based research on a specific research topic under the supervision of a faculty member. Permission of instructor required.

1-6 Credits

BT-360 Introduction to Bioprocessing

LASC Categories: NLL

Prerequisites: BI-204 as a pre-requisite, or CH-410 as a co-requisite.

This laboratory course covers the process development and manufacturing of biologics. It includes process development, upstream, downstream and other topics central to large scale production. At the end of the course, students will see the importance of every step from discovery to bulk fill in providing safe drugs to market.

Fall only and every 2-3 years. 4 Credits

BT-375 Tissue Culture

LASC Categories: NLL

Prerequisites: BI-204 and CH-210 with a grade of C- or above.

A review of the methods of animal and plant tissue culture. Media preparation, aseptic techniques and cell culture technology. Three lecture hours and three laboratory hours per week.

Spring only and every year. 4 Credits

BT-376 Biotechnology

LASC Categories: NLL

Prerequisites: CH-120, CH-121, BI-141 and BI-204 with a grade of C- or above.

Principles, applications of recombinant DNA (molecular/microbial aspects). The Biotechnology industry including bioreactor manufacturing standards and government rules. Three lecture hours and three laboratory hours per week.

Fall and Spring and every year. 4 Credits

BT-377 Fermentation Technology

LASC Categories: NLL

Prerequisites: BI-141 and BI-204 with a grade of C- or above.

Explores the application of biological and engineering principles involved in manufacturing pharmaceutical products.

Every 2-3 years. 4 Credits

BT-378 Bioinformatics

LASC Categories: NLL

Prerequisites: BI-141 and BI-203 with a grade of C- or above.

Provides an overview of Bioinformatics including database structure, genomics, computational biology and proteomics. Three lecture hours and three laboratory hours per week.

4 Credits

BT-408 Directed Study: Biotechnology

Directed study offers students, who because of unusual circumstances may be unable to register for a course when offered, the opportunity to complete an existing course with an established syllabus under the direction and with agreement from a faculty member.

3 Credits

BT-410 Biotechnology Seminar

LASC Categories: CAP

Up-to-date developments in Biotechnology; preparation and presentation of technical literature. Students will study new techniques and procedures used by the industry.

1-4 Credits

BT-440 Advanced Research Experience

Prerequisites: BI-205. Instructor permission required. Junior/Senior standing required.

Advanced lab and/or field based research on a specific research topic under the supervision of a faculty member.

1-6 Credits

BT-450 Internship in Biotechnology

Qualified upper-level biotechnology majors can learn experimental techniques by working in a company laboratory or a professional manufacturing environment. Consent of department and faculty sponsor. Fall and Spring and every year. 3-6 Credits