

Master of Science in Engineering Technology Degree Plan - Biotechnology Track

The Master of Science in Engineering Technology - Biotechnology (MS ET-BTEC) track provides an advanced knowledge of biology and technology. This program focuses on bioprocessing, protein engineering, computational biology, and federal regulations. Designed to help prepare individuals to conduct or supervise research and development in biotechnology or medical fields. This degree is a highly inter- and multi-disciplinary field that defines interdisciplinary education and research in the 21st century.

M.S. Engineering Technology (31/34 hours) Biotechnology Track	
Core Courses: (7 hours)	Hours (7)
BTEC 6100: Seminar in Biotechnology	1
TECH 6360: Experimental Design and Data Analysis	3
TEPM 6301: Project Management Principles	3
Required Courses: (Choose 18 BTEC hours)*	Hours (18)
Research: Choose Thesis (6 hours) or Project (9 hours)	Hours (6 or 9)
Thesis Option (6 hours) BTEC 6399 (6 credits)	Project Option (9 hours) BTEC 6396 (3 credits) AND 6 credits of approved BTEC course work

*Two approved, non-BTEC courses may be applied toward the Required Courses section.

BTEC 6100: Biotechnology Seminar

Cr. 1. (1-1). Prerequisites: Graduate standing or consent of the instructor. Students are introduced to library, computing, and research facilities. Faculty overview the responsible conduct of research, ethics, and describe research methods, and fields in Biotechnology.

BTEC 6101 – Biotechnology Techniques and Methods

Cr. 1.0 (1-0) Prerequisite: Graduate standing and consent of instructor. Modern techniques used in biotechnology laboratories.

BTEC 6302 - Introduction to Regulatory Affairs

Cr. 3.0 (3-0) Prerequisite: Graduate standing and consent of instructor. Overview of federal and global regulations of biotechnology products. Topics include: history, regulatory agencies, drugs, biologics, and medical device submissions, GLP, GCP, GMP, and FDA inspections.

BTEC 6303 – Protein Engineering Technology

Cr. 3.0 (3-0) Prerequisite: Graduate standing and consent of instructor. Cellular and genetic engineering of expression constructs and hosts for optimization of biotherapeutic protein production; approaches and challenges.

BTEC 6304 – Computational Methods in Biotechnology

Cr. 3.0 (3-0) Prerequisite: Graduate standing and consent of instructor. Application of computers to solve problems in biotechnology and medicine. Statistical analysis and inference (experimental design and analysis), biological modeling and simulation, and biological imaging.

BTEC 6401 - Bioprocessing in Biotechnology

Cr. 4.0 (3-3) Prerequisite: Graduate standing and consent of instructor. Course covers microbial growth, kinetics, and fermentation operation as applicable to bioprocessing. Laboratory experiments will cover upstream and downstream techniques of product processing such as cell culture and protein purification.

BTEC 6396: Master's Project

Cr. 3. (3-0). Master's project. May be repeated for six semester hours credit.

BTEC 6397: Selected Topics in Biotechnology

Cr. 3. (3-0). Prerequisite: approval of department chair. May be repeated for credit when topics vary.

BTEC 6399: Master's Thesis

Cr. 3. May be repeated for six semester hours credit.

TECH 6360: Experimental Design and Data Analysis

Cr. 3. (3-0). Prerequisites: MATH 1432, TMTH 3360 or equivalent. Standard experimental design and the corresponding data analysis techniques. Application of the computer for data analysis tools including standard statistics application programs. Emphasis on interpretation of data sets resulting from experimentation in the fields of electronics, manufacturing, and construction management.

TEPM 6301: Project Management Principles

Cr. 3. (3-0). Prerequisite: Technical undergraduate degree or consent of graduate faculty advisor. Overview of project management for technology-intensive workplaces. The basic tools of project management, including breakdown structure, scheduling, contracting, earned value analysis, and risk management, are described, as well as the elements that are critical to a technical project's success.