

# Biotechnology: Genomics & Biomanufacturing

## Associate in Science

### ***DIVISION OF SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS***

Biomanufacturing and Genomics technologies have a growing importance in the biopharmaceutical and biotechnology industry. This concentration program will introduce students to the ever-expanding industries related to biotechnology, biopharmaceutical, and biomedical sciences. The goal of this program is to introduce students to modern biological techniques, which they will use to apply their scientific knowledge and skills to real-world biotech research and academic problems and to train and educate students to acquire skill sets that are top in-demand techniques/expertise in the biotechnology industry, including genomics, biomanufacturing process, and biopharma R&D. These techniques include bioreactor use, *in vivo* and *in vitro* cell culturing, GMP-Good Manufacturing Practices, aseptic technique, genomic editing techniques like CRISPR, equipment prep, chromatography, assays for functional characterization, transcriptome analysis, and DNA sequencing analysis. Besides, students will learn soft critical skills, including critical thinking skills. These techniques will also provide a strong foundation for those students who are willing to pursue their career in four-year colleges/universities or advanced R&D laboratories. Since our biotechnology program is a research-based and peer mentoring intensive program structured to engage nontraditional students, our curriculum uses inquiry-based laboratories, hands-on instruction, and internships in world-renowned institutions to confer in-depth scientific knowledge to students.

Upon successful completion, the Associate in Science Degree in [Biotechnology: Genomics & Biomanufacturing](#) is awarded.

### **PROGRAM FOOTNOTES:**

#### **Humanities Electives:**

Art, Communication, English (EN 103 or higher), ESL (ES 100 or higher; up to 6 credits), Film, Foreign Language, Humanities, Literature, Music, Oral Communication, Philosophy, Photography, Sign Language, Theater Arts

**Computer Science Electives:** Computers and Technology (CS 100), Introduction to Computer Science (CS 110), Python Programming (CS 123)

#### **Social Science Electives:**

Anthropology, Economics, Geography, Government, History, Law, Psychology, Sociology

A grade of C or higher is required for all Biotechnology (BT) courses.

COURSE	COURSE TITLE	CREDITS
<i>First Year</i>	<i>Semester 1</i>	
BI 110	Principles of Biology I w/ Lab	4
BT 101	Introduction to Biotechnology	3
CH 110	Principles of Chemistry I w/ Lab	4
EN 101	English Composition I	3
MA 102 *	College Algebra	3
	<b>credits:</b>	17
<i>First Year</i>	<i>Semester 2</i>	
BI 120	Principles of Biology II w/ Lab	4
BT 201	Cell Culture	3
CH 120	Principles of Chemistry II w/ Lab	4
	Computer Science Elective	3/4
EN 102	English Composition II	3
	<b>credits:</b>	17/18
<i>Second Year</i>	<i>Semester 1</i>	
BI 246	Molecular and Dev Biology w/ Lab	4
BT 225	Biomanufacturing I	4
CH 201	Organic Chemistry I w/ Lab	4
	Humanities/Social Science Elective	3
	<b>credits:</b>	15
<i>Second Year</i>	<i>Semester 2</i>	
BT 202	Genomics	4
CH 210	Biochemistry I w/ Lab	4
CT 100	Critical Thinking	3
	Social Science Elective	3
	<b>credits:</b>	14
<i>Second Year</i>	<i>Summer</i>	
BT 240	Biotechnology Internship	4
	<b>credits:</b>	4
	<b>Total Credits:</b>	<b>67/68</b>

\*Pre-Calculus Mathematics (MA 104) may be substituted

Quantitative skills are a MassBay graduation competency for associate degree programs. Prior to graduation, students must demonstrate this competency by completing a 100-level math course (not MAC); or placing into a 200-level mathematics course.

This program qualifies as an Alternative Transfer Agreement (MassTransfer) with select public institutions in Massachusetts. For more information, visit [www.mass.edu/masstransfer](http://www.mass.edu/masstransfer).