Biotechnology

HAGERSTOWN COMMUNITY COLLEGE

What is the Biotechnology Program?

Biotechnology is broadly defined as using living organisms, or products of living organisms, to improve life, to make a product, or to solve a problem. This field is one of the most rapidly changing areas of science. The 21st century has been called the "century of biotechnology."

Individuals working in biotechnology are directly or indirectly involved in the process of discovering, developing, manufacturing, or regulating the final quality of new products. Typical job titles include biological sciences technician, laboratory technician, research technician, or research assistant.

Most entry-level technicians in a research environment are responsible for preparing materials and maintaining equipment used by scientists. With experience and more education, these technicians evolve into research assistants and carry out experiments under the supervision of established scientists. In the manufacturing branch of biotechnology, entry-level positions are material handlers, manufacturing assistants, and engineering technicians. Additional information is available online at *www.hagerstowncc.edu/biotech*.

What type of students excel in this program?

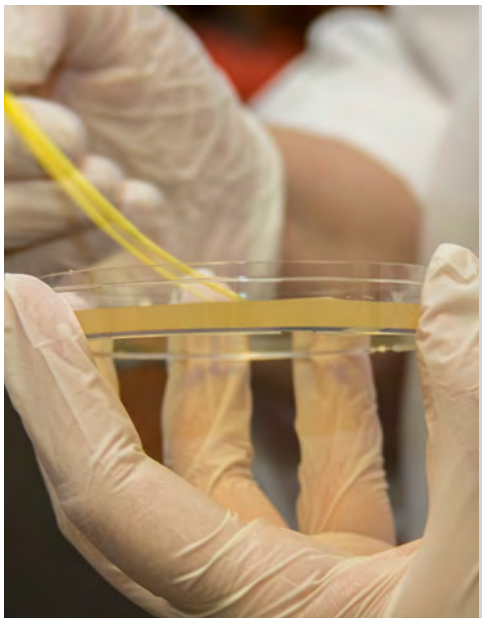
Students who do well in this program typically have good attention to detail, excellent written communication skills, good motor skills, and the ability to focus for long periods of time.

What is the employment outlook for this career field?

Maryland has one of the strongest life science industries in the nation. Nationally, biological technician jobs are expected to grow at 7% (as fast as average). However, according to a report released by the Milken Institute on Job Creation in Maryland's Life Sciences Industry, positions in research and development increased by 7% and manufacturing jobs increased by 30% in 2020.

What types of jobs do biological technicians perform?

There are many different types of biotechnology, which have resulted in a huge industry that employs approximately 200,000 people nationwide. There are a wide range of employment choices such as laboratory technicians, computer programmers, laboratory directors, research associates, principle or senior scientists, bioinformaticists, manufacturing and production technicians, and associates and engineers. The work they perform can relate to medical and pharmaceutical research, microbiology, forensics, agriculture, bioremediation and many other types of research and product development. The biotechnology industry has been in existence for about 40 years.



PROGRAM OPTIONS

- A.A.S. Degree, Biotechnology
- Certificate, Biotechnology

CAREER OUTLOOK

MEDIAN SALARY

$48K

for Biological Technicians

EMPLOYMENT

7% increase in the next 10 years

(source: www.bls.gov/ooh)

What are the program options?

Students can earn a certificate (23 credits) or the two-year associate of applied science degree in biotechnology (60 credits). With the completion of either of these programs, students are usually prepared to begin work as a technician or transfer into a bachelor's program. Some students may prefer to earn the two-year associate degree in biology or chemistry and transfer to an upper-division program using their biotechnology skills to work part-time in a research, industrial, or undergraduate laboratory while completing the last two years of their baccalaureate program.

Why choose HCC?

- All biotechnology courses are offered in fully-equipped, state-of-the-art laboratories in the STEM Building
- Biotechnology classes are taught by faculty with research credentials in the biotech industry
- HCC's biotechnology program has been supported by $1.5 million in grants
- Students in the Biotechnology Program can complete internships, which helps them get on-site training and prepares them for employment in the biotech industry. Internships are available in the following areas:
  - Biotechnology firms in Montgomery and Frederick counties
  - One of the start-up companies in HCC's David W. Fletcher's Incubator and Labs
  - In the public sector including Fort Detrick in Frederick or the U.S. Department of Agriculture, based in W.Va.

For more information about HCC graduation rates, the median debt of students who completed the program, and other important information, visit *www.hagerstowncc.edu/biotech*.

A.A.S. Degree

Biotechnology

The Biotechnology Program is designed to prepare students for entry-level technician positions in biomedical, research, and industrial laboratory areas. Depending on a person's academic background and work experience, the biotechnology technician-in-training may complete the one year biotechnology certificate (23 credits) or the two-year associate of applied science (A.A.S.) degree in biotechnology (60 credits).

The biotechnology courses are offered in fully-equipped state-of-the-art laboratories and graduates have the necessary skills, knowledge, and attributes to work immediately upon graduation and to advance with on-the-job experience and continued academic training. Some areas of opportunity for graduates include: biomedical technology, biomanufacturing, pharmaceuticals, plant research, and forensics.

General Education Requirements 23-24 credits

Arts and Humanities

Select from approved General Education course list .. 3

Behavioral/Social Sciences

Select from approved General Education course list .. 3

Biological/Physical Science

BIO 113 Principles of Biology I 4
CHM 101 Introductory College Chemistry..... 4
OR
CHM 103 General Chemistry I ..... (4)

Diversity

Select from approved General Education course list .. 3

English

ENG 101 English Composition..... 3
*Minimum grade of a "C" or better is required.

Mathematics

Select one course from the approved General Education course list (MAT 160 or MAT 109 recommended).....3-4

Program Requirements 23 credits

BIO 205 Microbiology 4
BTC 101 Introduction to Biotechnology..... 4
BTC 120 Cell Culture & Cell Function 4
BTC 201 Discovery Research 4
BTC 202 Biomanufacturing..... 4
MAT 109 Introduction to Statistics..... 3

Restricted Electives 13-14 Credits

Select restricted elective credits from the list below.
BTC 269 - Biotechnology Internship I is strongly recommended for all qualified students.

ADJ 101 Introduction to Criminal Justice.....(3)
ADJ 204 Criminal Investigation .....(3)
BIO 203 Human Anatomy and Physiology I.....(4)
BIO 204 Human Anatomy and Physiology II .....(4)
BIO 114 Principles of Biology II.....(4)
BTC 103 Forensic Science .....(4)
BTC 269 Biotechnology Internship I.....(3)
BTC 270 Biotechnology Internship II.....(3)
CHM 103 General Chemistry I .....(4)
CHM 104 General Chemistry II .....(4)
CHM 203 Organic Chemistry I .....(4)
CHM 204 Organic Chemistry II .....(4)
CSC 102 Introduction to Information Technology.....(3)
CYB 101 Introduction to Cybersecurity.....(3)
EGR Select any Engineering Science course.....(3-4)
ENG 112 Technical Writing .....(3)
ENV 201 Fundamentals of Environmental Science I.....(4)
ENV 202 Fundamentals of Environmental Science II.....(4)
IST 166 Computer Forensics I—Principles and Practices .....(3)
IST 266 Computer Forensics II—Investigations Practices.....(3)
MAT 161 Precalculus II.....(4)
MAT 203 Calculus I .....(4)
MAT 204 Calculus II .....(4)
PHL 103 Ethics .....(3)
PHY 201 General Physics I.....(4)
PHY 202 General Physics II.....(4)
STU 106 Professionalism in the Workplace.....(1)

Degree Requirement.....60

Certificate

Biotechnology

The biotechnology certificate is designed for the technician-in training with the academic background and work experience to complete a program in one year, work immediately, and advance with on-the-job experience. The credits earned in the certificate can be applied to the A.A.S. degree or to many B.S. degrees at upper division institutions. Some areas of opportunity for technicians with this certificate include: biomedical technology, biomanufacturing, pharmaceuticals, plant research, and forensics.

Program Requirements 23 credits

BIO 113 Principles of Biology I..... 4
BTC 101 Introduction to Biotechnology..... 3
BTC 120 Cell Culture & Cell Function 4
BTC 201 Discovery Research 4
OR
BTC 202 Biomanufacturing.....(4)
CHM 101 Introductory College Chemistry 4
OR
CHM 103 General Chemistry I .....(4)
Select one course from the approved General Education course list (MAT 114 or MAT 109 recommended).....(3-4)

Certificate Requirement 23

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