

BIOTECHNOLOGY (AAS)

Award: Associate of Applied Science Degree

No. of credits required: 60

For more information: Contact Associate Professor Jaclyn Madden, 443-412-2046, jmadden@harford.edu (August 15 - June 15); stem@harford.edu; or Admissions, 443-412-2109.

Program Description

The biotechnology program prepares students with the concepts, techniques, and skills needed for entry-level bioscience laboratory work in biotechnology, chemical, and biological laboratories. The program provides a foundation in principles of the natural and physical sciences and a strong emphasis on biotechnology and analytical techniques and applications, as identified by biotechnology industry members. The biotechnology industry is expected to continue to grow in Maryland and the region.

Program Goals

1. Explain the basic principles, concepts, and techniques of biotechnology.
2. Apply principles, methods, and quantitative skills to novel problems and situations.
3. Execute biotechnology laboratory tasks utilizing Standard Operating Procedures (SOPs) and Current Good Manufacturing Practices (CGMPs).
4. Demonstrate critical thinking and scientific process skills.
5. Evaluate appropriate sources of scientific information.
6. Analyze the role of biotechnology in society and employ the skills of scientific communication.
7. Demonstrate professional judgement and behaviors that adhere to principles of the responsible conduct of research.

Employment Information

The primary roles and responsibilities of **Biological Technologists** or Laboratory (Lab) Technicians, are to help biological and medical scientists conduct laboratory tests and experiments. Under the supervision of biologists, microbiologists, chemists, and medical scientists, bio/lab technicians perform scientific tests, experiments, and analyses. To conduct experiments and analyses, they use traditional laboratory instruments, advanced robotics, automated equipment. Additionally, they use specialize computer software to collect, analyze, and model experimental data. Biotechnicians who work with zoologists and wildlife biologists may need be able to travel through wilderness areas and hike rugged terrain in order to assist with collecting field samples. They may administer new medicines and treatments to lab animals; separate proteins from other cell material; study living microbes; and stain specimens to aid identification. They may test samples in environmental impact studies, or monitor production processes to help ensure that products are not contaminated. They work in government sector, healthcare and private industry.¹

¹ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Biological Technicians, at <https://www.bls.gov/ooh/life-physical-and-social-science/biological-technicians.htm> (visited April 29, 2021).

Diversity Requirement

To satisfy the diversity requirement: Associate degree students must complete one 3-credit diversity course (D). It is recommended that students select one of the 3-credit (GB), (GH), (GI) course electives from those that also appear on the approved list of diversity course graduation requirements.

Recommended Course Sequence

First Semester		Credits
ENG 101	English Composition (GE)	3
BIO 120	General Biology I (GL)	4
BIO 128	Introduction to Biotechnology	4
CHEM 111	General Chemistry I (GL)	4
Credits		15
Second Semester		
BIO 211	Microbial Biotechnology	4
CHEM 112	General Chemistry II A (GL) (Select from the following:)	4
Select from the following: ¹		4
MATH 216	Introduction to Statistics (GM)	
DSCI 102	Introductory Statistics with Programming Applications (GM)	
MATH 109	Precalculus Mathematics (GM)	
MATH 203	Calculus I (GM)	
Behavioral/Social Science Elective (GB) (https://catalog.harford.edu/general-education/#behavioral-social-science) ²		3
Credits		15
Third Semester		
BIO 208	Genetics	4
BIO 212	Principles of Biomanufacturing	4
BIO 213	Cell Culture Techniques	4
Arts/Humanities Elective (GH) (https://catalog.harford.edu/general-education/#arts-humanities)		3
Credits		15
Fourth Semester		
BIO 214	Molecular Techniques	4
BIO 215	Immunology Principles and Applications	4
Physical Education Elective		1
Program Electives		6
Credits		15
Total Credits		60

¹ Students may not receive credit for both DSCI 102 Introductory Statistics with Programming Applications (GM) and MATH 216 Introduction to Statistics (GM).

² Students must complete one course (3-credits) that meets the diversity requirement for graduation.

Program Electives (choose a total of 6 credits)

Code	Title	Credits
BIO 121	General Biology II (GL)	4
BIO 191	Independent Study: Biology	1
BIO 192	Independent Study: Biology	2

BIO 193	Independent Study: Biology	3
BIO 194	Independent Study: Biology	4
BIO 271	Cooperative Education I: Biology	1
BIO 272	Cooperative Education II: Biology	2
BIO 273	Cooperative Education III: Biology	3
BIO 274	Cooperative Education IV Biology	4
CHEM 207	Organic Chemistry I	4
CHEM 208	Organic Chemistry II	4
CSI 131	Computer Science I	4
CSI 132	Computer Science II	4
DSCI 101	Introduction to Data Science	3
MATH 109	Precalculus Mathematics (GM)	4
MATH 203	Calculus I (GM)	4
MATH 204	Calculus II (GM)	4
PHYS 101	Introductory Physics I (GL)	4
PHYS 102	Introductory Physics II (GL)	4
PHYS 200	General Physics I Lab (GL)	1
PHYS 203	General Physics: Mechanics and Particle Dynamics (GS)	3
PHYS 204	General Physics: Vibrations, Waves, Heat, Electricity and Magnetism (GL)	4
PHIL 220	Bioethics (GH)	3
ENG 109	English Composition: Research Writing	3
ENG 209	Technical Writing	3

General Education Degree Requirements

Note: The following codes identify courses which satisfy the General Education Degree Requirements:

Behavioral/Social Science (GB)

English Composition (GE)

Arts/Humanities (GH)

Interdisciplinary and Emerging Issues (GI)

Biological/Physical Laboratory Science (GL)

Mathematics (GM)

Biological/Physical Science (GS)