

# BIOTECHNOLOGY A.A.S. (CAREER)

Program website ([https://www.frederick.edu/programs/science,-technology,-engineering,-and-math-\(stem\)/biotechnology.aspx](https://www.frederick.edu/programs/science,-technology,-engineering,-and-math-(stem)/biotechnology.aspx))

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## Program Description

Prepares individuals to work as process operators in biological products manufacturing facilities. Students will combine basic science and communication skills, manufacturing technologies and good manufacturing practices in the course of study. Students will develop a strong basic science foundation with a sound understanding of the major technologies employed in the industry. They will also develop collaborative and disciplined work ethics while consistently practicing problem-solving skills. Upon successful completion of the program, individuals will possess the necessary skills to qualify for employment in a variety of bioprocessing industries.

## Program Learning Outcomes

- Articulate central themes of the discipline.
- Apply and demonstrate entry-level biotechnology skills and techniques.
- Demonstrate discipline-specific scientific inquiry.
- Communicate discipline-specific knowledge.
- Integrate discipline-specific technology.
- Demonstrate appropriate quantitative skills.
- Analyze the role of biotechnology in society.

## Program Requirements

- Students must complete their credit **English and Mathematics** within the first 24 credits.
- One course must meet the cultural competence graduation requirement (<https://frederick-public.courseleaf.com/general-education-core/#cultural>).
- **CORE: The General Education CORE** is that foundation of the higher education curriculum providing a coherent intellectual experience for all students. Students should check with an advisor or the transfer institution (ARTSYS) before selecting General Education CORE requirements. <http://artsys.usmd.edu/>
- In some General Education categories (Mathematics, Biological & Physical Sciences), a 4-credit course selected from the GenEd course list will satisfy the requirement in place of a 3-credit course. Students should check with an advisor before selecting these courses.
- For the Physical Education, Health, or Nutrition requirement, a 3-credit PHED, HLTH, or NUTR course may satisfy the requirement in place of a 1-credit course. Students should check with an advisor before selecting this course.
- Students must earn a grade of "C" or better in ENGL 101 English Composition.

Code	Title	Credits
<b>English</b>		
ENGL 101	English Composition	3

### Mathematics

Mathematics Elective (Gen Ed course list) ( <a href="https://frederick-public.courseleaf.com/general-education-core/#mathematics">https://frederick-public.courseleaf.com/general-education-core/#mathematics</a> ) (MATH 120 or higher)	3
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### Social & Behavioral Sciences

Social & Behavioral Sciences Elective (Gen Ed course list) ( <a href="https://frederick-public.courseleaf.com/general-education-core/#social-behavioral">https://frederick-public.courseleaf.com/general-education-core/#social-behavioral</a> )	3
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### Arts & Humanities

Communication Elective (Gen Ed course list) ( <a href="https://frederick-public.courseleaf.com/general-education-core/#communication">https://frederick-public.courseleaf.com/general-education-core/#communication</a> )	3
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### Biological & Physical Sciences

BSCI 150	Principles of Biology I	4
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CHEM 101	General Chemistry I	4
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### Physical Education, Health, or Nutrition Requirement

Select one PHED, HLTH, or NUTR course	1
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### Departmental Requirements

BSCI 223	Microbiology for Allied Health	4
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or BSCI 263	Elements of Microbiology (Fall)	
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BIOT 101	Biotechnology and Society	3
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BIOT 102	Regulatory Aspects of Biotechnology (Fall)	3
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BIOT 103	Basic Lab Techniques (Fall)	1
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BIOT 110	Molecular Biology Techniques (Spring)	4
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BIOT 214	Introduction to Biomanufacturing (Fall)	4
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BIOT 220	Cell Biology and Cell Culture Techniques (Spring)	4
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BIOT 222	Cell Therapy and Flow Cytometry (Spring)	4
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CMIS 105	Introduction to Programming	2
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Electives – Recommended courses below:	10
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BIOT 130	Forensic Biology	
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BIOT 224	Gene Therapy Fundamentals (Fall)	
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BSCI 240	Genetics (Spring)	
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CHEM 102	General Chemistry II	
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ENGL 219	Technical Writing	
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INTR 103	Internship	
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Total Credits	60
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## Transfer Note

For more information on careers and transfer, contact the Career and Academic Planning Services office at 301.846.2471 or visit Transfer Services (<https://www.frederick.edu/student-resources/counseling-advising/transfer-services.aspx>).

## Guided Pathway to Success (GPS)

Suggested schedules map your path to degree completion.

Students should meet with an advisor each semester to carefully select and sequence courses based on their specific academic goals and interests. Visit Jefferson Hall or call 301.846.2471 for advising.

Recommended First Semester		Credits
ENGL 101	English Composition <sup>1</sup>	3
Mathematics Elective (Gen Ed course list) ( <a href="https://frederick-public.courseleaf.com/general-education-core/#mathematics">https://frederick-public.courseleaf.com/general-education-core/#mathematics</a> ) (MATH 120 or higher) <sup>1</sup>		3-4
BSCI 150	Principles of Biology I	4
BIOT 101	Biotechnology and Society	3
BIOT 102	Regulatory Aspects of Biotechnology (Fall) (Milestone)	3
BIOT 103	Basic Lab Techniques (Fall)	1
Credits		17-18

### Recommended Second Semester

BSCI 223	Microbiology for Allied Health	4
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or BSCI 263	or Elements of Microbiology (Fall)	
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BIOT 110	Molecular Biology Techniques (Spring) (Milestone)	4
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CHEM 101	General Chemistry I	4
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Electives - Recommended courses below: <sup>2</sup>		3
INTR 103	Internship	
BIOT 130	Forensic Biology	
BIOT 224	Gene Therapy Fundamentals (Fall)	
BSCI 240	Genetics (Spring)	
CHEM 102	General Chemistry II	
ENGL 219	Technical Writing	
Credits		15

**Recommended Third Semester**

Communication Elective (Gen Ed course list) (<https://frederick-public.courseleaf.com/general-education-core/#communication>) 3

CMIS 105	Introduction to Programming	2
BIOT 214	Introduction to Biomanufacturing (Fall) (Milestone)	4

Electives - Recommended courses below: <sup>2</sup>		4
INTR 103	Internship	
BIOT 130	Forensic Biology	
BIOT 224	Gene Therapy Fundamentals (Fall)	
BSCI 240	Genetics (Spring)	
CHEM 102	General Chemistry II	
ENGL 219	Technical Writing	
Credits		13

**Recommended Fourth Semester**

BIOT 220	Cell Biology and Cell Culture Techniques (Spring)	4
BIOT 222	Cell Therapy and Flow Cytometry (Spring)	4

Physical Education, Health, or Nutrition Requirement 1,3

Social & Behavioral Sciences Elective (Gen Ed course list) (<https://frederick-public.courseleaf.com/general-education-core/#social-behavioral>) 3

Electives - Recommended courses below: <sup>2</sup>		3
INTR 103	Internship	
BIOT 130	Forensic Biology	
BIOT 224	Gene Therapy Fundamentals (Fall)	
BSCI 240	Genetics (Spring)	
CHEM 102	General Chemistry II	
ENGL 219	Technical Writing	
Credits		15-17

Total Credits 60-63

1

Take this course within the first 24 credits.

2

Choose electives in consultation with an advisor (credits may vary to fulfill 60 credits for degree)

**Part-time Students**

Part-time students should complete courses in the order listed on the pathway. Please contact program manager for questions about part-time status.

Students who take fewer than 15 credits each semester or who require developmental English or Math coursework will need additional semesters to complete their degrees. Summer term and January session classes may help students to make faster progress.

**Pathway Legend**

Milestone - courses with the Milestone notation should be taken within the recommend credit range to stay on track for program completion.

Fall, Spring, Summer - courses with a Fall, Spring, or Summer notation indicate the course is offered in the specified semester only.