

STEM: SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS A.S. (TRANSFER)

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

Program Description

Prepares students for transfer to four-year institutions in STEM disciplines.

A STEM education prepares students to think analytically, creatively, logically, and scientifically, and how to ask the questions and pose the solutions to the challenges facing our society.

Students can choose to major in the STEM: Science, Technology, Engineering, and Mathematics A.S. to explore various disciplines including biology, chemistry, computer aided design, computer & information sciences, engineering, mathematics, physical science, and physics.

Students also have the option to focus on a specific discipline within the STEM A.S. by selecting an Area of Concentration in Biology, Chemistry, Engineering, or Mathematics.

Students should meet with an advisor to develop a plan appropriate for their transfer and career interests. To investigate potential careers related to this degree program, visit the Career Communities (<https://www.frederick.edu/student-resources/career-services/career-communities.aspx>) page.

Students interested in courses of study such as pre-medical, pre-dental, pre-veterinary, pre-pharmacy, pre-physician assistant, or other graduate health programs should follow the STEM A.S. Degree: Biology or Chemistry Area of Concentration and meet with an academic advisor.

Program Learning Outcomes

- Demonstrate analytic thinking and problem solving skills in mathematics and the sciences.
- Effectively communicate mathematical explanations (verbal, graphical, numerical, and symbolic representations) and a basic understanding of the scientific method.
- Demonstrate an understanding of basic concepts in biological, chemical, computer science, physical, mathematics, or engineering disciplines.
- Demonstrate an ability to apply quantitative methods to chemical, computer science, biological, or engineering applications.
- Be prepared to enter transfer institutions in STEM fields.
- Demonstrate the ability to use technology appropriate to mathematical and scientific problem solving.

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.
- Students must complete a minimum of nine credits at the 200-level.

Code	Title	Credits
English		
ENGL 101	English Composition	3
Mathematics		
MATH 165	Precalculus ¹	4
or MATH 185	Calculus I	
Social & Behavioral Sciences		
Social & Behavioral Sciences Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#social-behavioral) - select two courses from different disciplines		6
Arts & Humanities		
Arts Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#arts)		3
Humanities Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#humanities)		3
Communication Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#communication)		3
Biological & Physical Sciences		
Biological & Physical Sciences Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#biological-physical)		3
Biological & Physical Sciences Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#biological-physical) (Lab course) ²		4
BSCI 150	Principles of Biology I (recommended)	
CHEM 101	General Chemistry I (recommended)	
PHYS 121	Fundamentals of Physics I (Fall) (recommended)	
PHYS 151	General Physics I (recommended)	
General Education Elective		
General Education Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#general)		3
Physical Education, Health, or Nutrition Requirement		
Select one PHED, HLTH, or NUTR course		1
Electives		
Select 27 credits ³		27
Total Credits		60

1

Biology, Chemistry, Engineering, and Mathematics Areas of Concentration require MATH 185 Calculus I or higher.

2

It is imperative to consult with an advisor to select the appropriate Science course for the transfer institution and major.

3

Take a minimum of 19 credits of STEM electives from any of the disciplines listed below. A minimum of 6 credits must be in the same discipline. It is imperative that students consult with an advisor before registering to maximize transfer of coursework; for example some programs will also require MATH 185 Calculus I.

- Biology (BSCI)
- Chemistry (CHEM)
- Computed Aided Design Technology (CADT)
- Computer & Information Sciences (CMIS)
- Engineering (ENGR)
- Mathematics (MATH)
- Physical Science (PHSC)
- Physics (PHYS)

Students majoring in the Associate of Science in STEM without an Area of Concentration should follow the curriculum outlined above and will have 8 unrestricted elective credits. It is recommended that they take CMIS 106 Object Design and Programming.

Students majoring in an Area of Concentration will follow the curriculum for their major (Biology, Chemistry, Engineering, or Mathematics).

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 ¹	3
Select one of the following:		4
MATH 165	Precalculus ¹	
MATH 185	Calculus I ^{1,2}	
Select a STEM course in consultation with an advisor (Milestone) ³		3
Biological & Physical Sciences Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#biological-physical) - Recommended course(s) below: ⁴		3-4
BSCI 150	Principles of Biology I	
CHEM 101	General Chemistry I	
PHYS 121	Fundamentals of Physics I (Fall)	
PHYS 151	General Physics I	
Humanities Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#humanities)		3
Credits		16-17
Recommended Second Semester		
Communication Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#communication)		3
Biological & Physical Sciences Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#biological-physical) (Lab course) - Recommended course(s) below: ⁴		4
BSCI 150	Principles of Biology I	
CHEM 101	General Chemistry I	
PHYS 121	Fundamentals of Physics I (Fall)	

PHYS 151	General Physics I	
Select a STEM course in consultation with an advisor (Milestone) ³		4
Select an elective in consultation with an advisor		4
Credits		15
Recommended Third Semester		
Arts Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#arts)		3
Social & Behavioral Sciences Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#social-behavioral)		3
Select a STEM course in consultation with an advisor (Milestone) ³		4
Select a STEM course in consultation with an advisor ³		4
Credits		14
Recommended Fourth Semester		
Social & Behavioral Sciences Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#social-behavioral) (in a different discipline from first)		3
General Education Elective (Gen Ed course list) (https://frederick-public.courseleaf.com/general-education-core/#general)		3
Physical Education, Health, or Nutrition Requirement		1,3
Select a STEM course in consultation with an advisor ³		4
Select an elective in consultation with an advisor (credits may vary to fulfill 60 credits for degree)		4
Credits		15-17
Total Credits		60-63

1

Take this course within the first 24 credits.

2

Areas of Concentration in Biology, Chemistry, Engineering, and Mathematics require MATH 185 Calculus I or more advanced Math.

3

Choose a course from Biology (BSCI), Chemistry (CHEM), Computer Aided Design (CADT), Computer & Information Sciences (CMIS), Engineering (ENGR), Mathematics (MATH), Physical Science (PHSC), Physics (PHYS). Recommend CMIS 106 Object Design and Programming and MATH 185 Calculus I (or more advanced Math). A minimum of 6 credits must be in the same discipline. Consult an advisor to maximize transfer of coursework.

4

It is imperative to consult with an advisor to select the appropriate Science course for the transfer institution and major.

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.