MATHEMATICAL SCIENCES, B.S.

Begin Campus: Any Penn State Campus

End Campus: Harrisburg

Degree Requirements

For the Bachelor of Science degree in Mathematical Sciences, a minimum of 120 credits is required; for the Bachelor of Science degree in Mathematical Sciences with the Secondary Education option, a minimum of 121 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	84-99

9-21 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 3 credits of GWS courses; 6 credits of GQ courses. In addition, the Secondary Education option includes 6 credits of GH courses and 6 credits of GS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

Code	Title	Credits
Prescribed Courses		
Prescribed Courses: Require a grade of C or better		
ENGL 202C	Effective Writing: Technical Writing	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
MATH 311W	Concepts of Discrete Mathematics	3
MATH 401	Introduction to Analysis I	3
MATH 430	Linear Algebra and Discrete Models I	3
Requirements for the Option		
Select an option		64-77

Requirements for the Option

Data Science Option (64 credits)

Code	Title	Credits
Prescribed Courses		
CMPSC 445	Applied Machine Learning in Data Science	3
DS 220	Data Management for Data Sciences	3
MATH 230	Calculus and Vector Analysis	4
MATH 251	Ordinary and Partial Differential Equations	4
STAT 401	Experimental Methods	3
STAT/MATH 414	Introduction to Probability Theory	3
STAT/MATH 415	Introduction to Mathematical Statistics	3
STAT 462	Applied Regression Analysis	3
Prescribed Courses: Require a grade of C or better		
CMPSC 131	Programming and Computation I: Fundamentals	3
CMPSC 132	Programming and Computation II: Data Structures	3
MATH 220	Matrices	2
MATH/CMPSC 455	Introduction to Numerical Analysis I	3
Supporting Courses and Related Areas		
Select 15 credits of 300-400 level Mathematics courses.		15
Select 6 credits of 100-400 level courses.		6
Select 6 credits of 300-400 level courses in consultation with an academic adviser and in support of the student's interests.		6

General Mathematical Sciences Option (64 credits)

Code	Title	Credits
Prescribed Courses		
MATH 220	Matrices	2
MATH 230	Calculus and Vector Analysis	4
MATH 251	Ordinary and Partial Differential Equations	4
MATH 425	Introduction to Operations Research	3
MATH 435	Basic Abstract Algebra	3
MATH 475Y	History of Mathematics	3
STAT 401	Experimental Methods	3
Prescribed Courses: Require a grade of C or better		
MATH/CMPSC 455	Introduction to Numerical Analysis I	3
Additional Courses		
CMPSC 121	Introduction to Programming Techniques	3
or CMPSC 131	Programming and Computation I: Fundamentals	
STAT/MATH 318	Elementary Probability	3
or STAT/MATH 414	Introduction to Probability Theory	
Supporting Courses and Related Areas		
Select 6 credits of 100-400 level courses.		6
Select 18 credits of 300-400 level Mathematics courses in consultation with an academic adviser. Up to 6 of these credits may be replaced by any 300 or greater level CMPSC course (except CMPSC 360), CMPSC 221 or CMPSC 122.		18
Select 9 credits of 300-400 level courses in consultation with an academic adviser and in support of the student's interests.		9

Secondary Education in Mathematical Sciences Option (77 credits)

Code	Title	Credits
Prescribed Courses		
HDFS 239	Adolescent Development	3
Prescribed Courses: Require a grade of C or better		
EDPSY 14	Learning and Instruction	3
EDUC 313	Secondary Education Field Experience	2
EDUC 314	Learning Theory and Instructional Procedures	3
EDUC 315Y	Social and Cultural Factors in Education	3
EDUC 400	Diversity and Cultural Awareness Practices in the K-12 Classroom	3
EDUC 417	Teaching Secondary Mathematics	3
EDUC 458	Behavior Management Strategies for Inclusive Classrooms	3
EDUC 459	Strategies for Effective Teaching in Inclusive Classrooms	3

EDUC 466N	Foundations of Teaching English as a Second Language	3
EDUC 490	Student Teaching	12
MATH 220	Matrices	2
MATH 230	Calculus and Vector Analysis	4
MATH 250	Ordinary Differential Equations	3
MATH 425	Introduction to Operations Research	3
MATH 427	Foundations of Geometry	3
MATH 435	Basic Abstract Algebra	3
MATH 475Y	History of Mathematics	3
STAT 401	Experimental Methods	3
Additional Courses		
Additional Courses: Require a grade of C or better		
CMPSC 121	Introduction to Programming Techniques	3
or CMPSC 131	Programming and Computation I: Fundamentals	
Supporting Courses and Related Areas		
Select 3 credits of 100-400 level courses.		3
Supporting Courses and Related Areas: Require a grade of C or better		
Select 3 credits of literature (GH) from department list.		3
Select 3 credits of 300-400 level courses in Mathematics, Computer Science, Statistics, or Education.		3

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)
- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)
- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies
- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration
- **GN,** may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher**:** 6 credits

University Degree Requirements

First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.