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:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>84-99</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 311W</td>
<td>Concepts of Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 401</td>
<td>Introduction to Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 430</td>
<td>Linear Algebra and Discrete Models I</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

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
or STAT/MATH 318 Elementary Probability Theory 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)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>MATH 425</td>
<td>Introduction to Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>MATH 435</td>
<td>Basic Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 475Y</td>
<td>History of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 401</td>
<td>Experimental Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

Secondary Education in Mathematical Sciences Option (77 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 313</td>
<td>Secondary Education Field Experience</td>
<td>2</td>
</tr>
<tr>
<td>EDUC 314</td>
<td>Learning Theory and Instructional Procedures</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 315Y</td>
<td>Social and Cultural Factors in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 400</td>
<td>Diversity and Cultural Awareness Practices in the K-12 Classroom</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 417</td>
<td>Teaching Secondary Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 458</td>
<td>Behavior Management Strategies for Inclusive Classrooms</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 459</td>
<td>Strategies for Effective Teaching in Inclusive Classrooms</td>
<td>3</td>
</tr>
</tbody>
</table>
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.