

MATHEMATICS, B.S. (SCIENCE)

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

Two degrees are offered in mathematics: the Bachelor of Arts and the Bachelor of Science. Both programs have a common core of mathematics courses; both programs prepare students for graduate work in mathematics. In addition, the Bachelor of Arts degree is oriented toward applications of mathematics in the arts and the humanities. The Bachelor of Science degree has a number of options. These options are oriented toward actuarial science, applied and industrial, computational mathematics, graduate study and systems analysis.

Many of the options are designed for students who want to use mathematics in industry, commerce, or government. In short, the degree requirements have the flexibility to fit many individual interests. The student, with the assistance of a faculty adviser, should select an option by the end of the sophomore year.

What is Mathematics?

The study of mathematics emphasizes careful problem analysis, precision of thought and expression, and the development of mathematical skills needed for work in many other areas. Theoretical mathematicians increase basic knowledge in "pure" fields like abstract algebra, analysis, or topology. Applied mathematicians use tools growing out of calculus, analysis, computing, statistics, and operations research to solve problems in science, industry, government, and other areas.

You Might Like This Program If...

- You like mathematics, like to think, like a challenge, and like to know why things are true.
- You want to develop strong problem-solving skills, comprehension of abstract concepts, and creative thinking ability.
- You want to have access to a wide variety of careers in the fields of science and technology, finance and risk analysis, research and industry, and teaching.

Entrance to Major

In order to be eligible for entrance to the Mathematics major, a student must have:

1. attained at least a 2.00 cumulative grade point average; and
2. completed MATH 140 and MATH 141 and earned a grade of C or better in each of these courses.

Degree Requirements

For the Bachelor of Science degree in Mathematics, a minimum of 120 credits is required:

Requirement	Credits
General Education	45
Electives	0-1
Requirements for the Major	80-83

6 of the 45 credits for General Education are included in the Requirements for the Major. This includes 6 General Education GQ 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		
STAT 200	Elementary Statistics	4
<i>Prescribed Courses: Require a grade of C or better</i>		
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
MATH 220	Matrices	2
MATH 230	Calculus and Vector Analysis	4
MATH 311W	Concepts of Discrete Mathematics	3-4
MATH 312	Concepts of Real Analysis	3
Additional Courses		
Select one of the following:		3
CMPSC 101	Introduction to Programming	
CMPSC 121	Introduction to Programming Techniques	
CMPSC 201	Programming for Engineers with C++	
<i>Additional Courses: Require a grade of C or better</i>		
MATH 250	Ordinary Differential Equations	3-4
or MATH 251	Ordinary and Partial Differential Equations	
Requirements for the Option		
Select an option		50-51

Requirements for the Option Actuarial Mathematics Option (50-51 credits)

Code	Title	Credits
Prescribed Courses		
<i>Prescribed Courses: Require a grade of C or better</i>		
IE 425	Stochastic Models in Operations Research	3
MATH 414	Introduction to Probability Theory	3
MATH 415	Introduction to Mathematical Statistics	3
MATH 416	Stochastic Modeling	3
MATH 484	Linear Programs and Related Problems	3
RM 302	Risk and Insurance	3
RM 410	Financial Mathematics for Actuaries	3
RM 411	Long Term Actuarial Mathematics - Fundamentals	3
RM 412	Long Term Actuarial Mathematics - Advanced Topics	3
STAT 462	Applied Regression Analysis	3
Additional Courses		
<i>Additional Courses: Require a grade of C or better</i>		
MATH 451	Numerical Computations	3
or MATH 486	Mathematical Theory of Games	
STAT 463	Applied Time Series Analysis (or 400-level MATH course) ¹	3

Supporting Courses and Related Areas

Select 14-15 credits from department list	14-15
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¹ Select 3 credits from STAT 463 or 400-level MATH courses except:

- MATH 401
- MATH 405
- MATH 406
- MATH 441
- MATH 470
- MATH 471

Applied and Industrial Mathematics Option (50-51 credits)

Code	Title	Credits
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Prescribed Courses

Prescribed Courses: Require a grade of C or better

MATH 403	Classical Analysis I	3
MATH 412	Fourier Series and Partial Differential Equations	3
MATH 414	Introduction to Probability Theory	3
MATH 415	Introduction to Mathematical Statistics	3
MATH 436	Linear Algebra	3
MATH 450	Mathematical Modeling	3
MATH 455	Introduction to Numerical Analysis I	3

Additional Courses

Additional Courses: Require a grade of C or better

Select 12 credits of the following:	12
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MATH 411	Ordinary Differential Equations	
MATH 416	Stochastic Modeling	
MATH 417	Qualitative Theory of Differential Equations	
MATH 419	Theoretical Mechanics	
MATH 421	Complex Analysis	
MATH 456	Introduction to Numerical Analysis II	
MATH 461		
MATH 467	Factorization and Primality Testing	
MATH 468	Mathematical Coding Theory	
MATH 479	Special and General Relativity	
MATH 484	Linear Programs and Related Problems	
MATH 485	Graph Theory	
MATH 486	Mathematical Theory of Games	

Supporting Courses and Related Areas

Select 17-18 credits from department list	17-18
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Computational Mathematics Option (50-51 credits)

Code	Title	Credits
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Prescribed Courses

CMPSC 122	Intermediate Programming	3
CMPSC 465	Data Structures and Algorithms	3

Prescribed Courses: Require a grade of C or better

MATH 414	Introduction to Probability Theory	3
MATH 415	Introduction to Mathematical Statistics	3
MATH 455	Introduction to Numerical Analysis I	3
MATH 456	Introduction to Numerical Analysis II	3
MATH 467	Factorization and Primality Testing	3
MATH 484	Linear Programs and Related Problems	3

Additional Courses

Additional Courses: Require a grade of C or better

Select 3 credits of the following:	3
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MATH 411	Ordinary Differential Equations	
MATH 412	Fourier Series and Partial Differential Equations	
MATH 417	Qualitative Theory of Differential Equations	

Select 6 credits of the following:	6
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MATH 310	Elementary Combinatorics	
MATH 468	Mathematical Coding Theory	
MATH 485	Graph Theory	

Supporting Courses and Related Areas

Select 17-18 credits from department list	17-18
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General Mathematics Option (50-51 credits)

Code	Title	Credits
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Prescribed Courses

Prescribed Courses: Require a grade of C or better

MATH 403	Classical Analysis I	3
MATH 414	Introduction to Probability Theory	3
MATH 415	Introduction to Mathematical Statistics	3

Additional Courses

Additional Courses: Require a grade of C or better

MATH 435	Basic Abstract Algebra	3
or MATH 436	Linear Algebra	

Select 3 credits of the following:	3
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MATH 411	Ordinary Differential Equations	
MATH 412	Fourier Series and Partial Differential Equations	
MATH 417	Qualitative Theory of Differential Equations	
MATH 419	Theoretical Mechanics	
MATH 421	Complex Analysis	

Select 6 credits of 400-level MATH courses ¹	6
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Supporting Courses and Related Areas

Select an approved sequence of 12 credits in MATH or a related area or an area of application	12
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Select 17-18 credits from department list	17-18
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¹ Select 6 credits of 400-level MATH courses except:

- MATH 401
- MATH 405
- MATH 406
- MATH 441
- MATH 470
- MATH 471

Graduate Study Option (50-51 credits)

Code	Title	Credits
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Prescribed Courses

Prescribed Courses: Require a grade of C or better

MATH 403	Classical Analysis I	3
MATH 404	Classical Analysis II	3
MATH 414	Introduction to Probability Theory	3
MATH 415	Introduction to Mathematical Statistics	3
MATH 421	Complex Analysis	3

MATH 429	Introduction to Topology	3
MATH 435	Basic Abstract Algebra	3
MATH 436	Linear Algebra	3

Additional Courses

Additional Courses: Require a grade of C or better
 Select 9 credits of 400-level MATH courses ¹ 9

Supporting Courses and Related Areas

Select 17-18 credits from department list 17-18

¹ Select 9 credits of 400-level MATH courses except:

- MATH 401
- MATH 405
- MATH 406
- MATH 441
- MATH 470
- MATH 471

Systems Analysis Option (50-51 credits)

Code	Title	Credits
Prescribed Courses		
<i>Prescribed Courses: Require a grade of C or better</i>		
MATH 414	Introduction to Probability Theory	3
MATH 415	Introduction to Mathematical Statistics	3
MATH 436	Linear Algebra	3
MATH 484	Linear Programs and Related Problems	3

Additional Courses

Additional Courses: Require a grade of C or better
 Select 6 credits of the following: 6

MATH 310	Elementary Combinatorics	
MATH 451	Numerical Computations	
MATH 485	Graph Theory	
MATH 486	Mathematical Theory of Games	

Select 3 credits from 400-level MATH courses ¹ 3

Supporting Courses and Related Areas

Select an approved sequence of 12 credits in an area of application; 12 possible areas include business, economics, industrial engineering, social sciences
 Select 17-18 credits from department list 17-18

¹ Select 3 credits of 400-level MATH courses except:

- MATH 401
- MATH 405
- MATH 406
- MATH 441
- MATH 470
- MATH 471

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.

Integrated B.A. or B.S. in Mathematics and M.A.S. in Applied Statistics

Available at the following campuses: *University Park*

Requirements for the Integrated B.A. or B.S. in Mathematics and M.A.S. in Applied Statistics can be found in the Graduate Bulletin (<https://bulletins.psu.edu/graduate/programs/majors/statistics/#integratedundergradgradprogramstext>).

Integrated B.S. in Mathematics and M.Ed. in Curriculum and Instruction

Available at the following campuses: *University Park*

Requirements for the Integrated B.S. in Mathematics and M.Ed. in Curriculum and Instruction can be found in the Graduate Bulletin (<https://bulletins.psu.edu/graduate/programs/majors/curriculum-instruction/#integratedundergradgradprogramstext>).

Program Learning Objectives

- Students will demonstrate technical expertise within major areas of mathematics, recognizing connections between different branches of mathematics, and understanding and appreciating the relationship of mathematics to other disciplines and fields.
- Students will demonstrate a breadth and depth of knowledge within mathematics, linking applications and theory, applying mathematics in a wide variety of settings, and demonstrating the ability to use mathematics as a tool to solve problems in disciplinary and interdisciplinary settings.
- Students will demonstrate an understanding and appreciation for the integration of technology in mathematical settings to explore mathematical problems and interpret the results.
- Students will demonstrate an ability to communicate mathematics effectively, presenting full and cogent solutions that include appropriate justification for their reasoning, describing mathematical ideas from multiple perspectives, and writing/presenting explanations clearly and precisely to an audience of peers and faculty.
- Students will demonstrate an ability for assessing and interpreting complex situations, choosing among several potentially appropriate mathematical methods of solution, understanding the differences between proofs and other less formal arguments, and making vague ideas precise by formulating them in mathematical language.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

University Park

Undergraduate Mathematics Office

Academic Advising

104 McAllister Building
University Park, PA 16802
814-865-7528
undergrad@math.psu.edu

Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2023-24 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition (*Note: the archive only contains suggested academic plans beginning with the 2018-19 edition of the Undergraduate Bulletin*).

Actuarial Mathematics Option: Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†#}	4 MATH 141 ^{*†#}	4
STAT 200	4 MATH 220 [*]	2
ENGL 15, 30H, or ESL 15 [‡]	3 General Education Course	3
ECON 102 (or General Education Course)	3 ECON 104 (or General Education Course)	3
PSU 16	1 Supporting Course (ACCTG 211 is recommended)	4
	15	16

Second Year

Fall	Credits Spring	Credits
MATH 230 [*]	4 MATH 414 or STAT 414 [*]	3
MATH 311W [*]	3 MATH 312 [*]	3

General Education Course	3 CMPSC 101, 121, or 201	3
General Education Course	3 General Education Course	3
General Education Course	3 Supporting Course (FIN 301 is recommended)	3
16		15

Third Year

Fall	Credits Spring	Credits
MATH 250 or 251*	3 MATH 415 or STAT 415*	3
MATH 484*	3 MATH 451, CMPSC 451, or MATH 486*	3
RM 410*	3 RM 411*	3
RM 302*	3 ENGL 202C, 202A, 202B, or 202D‡	3
CAS 100A, 100B, or 100C‡	3 Supporting Course (Chosen in consultation with an academic adviser)	3
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
16.5		16.5

Fourth Year

Fall	Credits Spring	Credits
STAT 462*	3 MATH 416 or STAT 416*	3
RM 412*	3 STAT 463 (or 400 Level MATH course except MATH 410, MATH 405, MATH 406, MATH 441, MATH 470 or MATH 471)*	3
IE 425*	3 General Education Course	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	2-3
	Supporting Course (Chosen in consultation with an academic adviser)	1
12		12-13

Total Credits 119-120

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain

attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Actuarial Mathematics Option (ALEKS Placement in MATH 21): Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits Summer	Credits
MATH 21	3 MATH 41	4 MATH 140 ^{*†#†}	4
STAT 200	4 General Education Course	3	
ENGL 15, 30H, or ESL 15 [‡]	3 General Education Course	3	
ECON 102 (or General Education Course)	3 ECON 104 (or General Education Course)	3	
PSU 16	1 Supporting Course (ACCTG 211 is recommended)	4	
	14	17	4

Second Year

Fall	Credits Spring	Credits Summer	Credits
MATH 141 ^{*†#†}	4 MATH 230 [*]	4 MATH 414 or STAT 414 [*]	3
MATH 220 [*]	2 MATH 311W [*]	3	
General Education Course	3 CMPSC 101, 131, or 201	3	
General Education Course	3 General Education Course	3	
General Education Course	3 General Education Course	3	
	15	16	3

Third Year

Fall	Credits Spring	Credits
MATH 250 or 251 [*]	3-4 MATH 312 [*]	3
MATH 484 [*]	3 MATH 415 or STAT 415 [*]	3
RM 410 [*]	3 RM 411 [*]	3
RM 302 [*]	3 FIN 301	3
CAS 100A, 100B, or 100C [‡]	3	
	15-16	12

Fourth Year

Fall	Credits Spring	Credits
STAT 462 [*]	3 MATH 416 or STAT 416 [*]	3
RM 412 [*]	3 MATH 451 or 486 [*]	3
IE 425 [*]	3 STAT 463 (or 400-level MATH) [*]	3
ENGL 202C, 202A, 202B, or 202D [‡]	3 Supporting Course (Chosen in consultation with an academic adviser)	3
General Education Course (GHW)	1.5 Supporting Course (Chosen in consultation with an academic adviser)	3-4
	General Education Course (GHW)	1.5
	13.5	16.5-17.5

Total Credits 126-128

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Actuarial Mathematics Option: Mathematics, B.S. at Commonwealth Campuses

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†#†}	4 MATH 141 ^{*†#†}	4
STAT 200	4 MATH 220 (or General Education Course) [*]	2-3
ENGL 15 [‡]	3 General Education Course	3
ECON 102 (or General Education Course)	3 ECON 104 (or General Education Course)	3
PSU 16	1 ACCTG 211	4
	15	16-17

Second Year

Fall	Credits Spring	Credits
MATH 230 [*]	4 MATH 414 [*]	3
MATH 220, 250, or 251 ^{*1}	2-4 MATH 311W [*]	3
General Education Course	3 CMPSC 101, 131, or 201	3
General Education Course	3 General Education Course	3
CAS 100	3 FIN 301	3
	RM 214	1.5
	15-17	16.5

Third Year

Fall	Credits Spring	Credits
MATH 312 [*]	3 MATH 415 [*]	3
MATH 250 or 251 (or General Education Course) ^{*1}	3 MATH 451 or 486 [*]	3
RM 410 [*]	3 RM 411 [*]	3
RM 302 [*]	3 ENGL 202C, 202A, 202B, or 202D [‡]	3
MATH 484 [*]	3 Supporting Course (Chosen in consultation with an academic adviser)	3
	General Education Course (GHW)	1.5
	15	16.5

Fourth Year

Fall	Credits Spring	Credits
STAT 462 [*]	3 MATH 416 [*]	3
RM 412 [*]	3 STAT 463 (or 400 Level MATH) [*]	3
IE 425 [*]	3 General Education Course	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3

General Education Course (GHW)	1.5	
	13.5	12

Total Credits 119.5-122.5

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

¹ Semester will vary based on campus MATH 220 and MATH 250/251 offerings.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Applied and Industrial Option: Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†‡#}	4 MATH 141 ^{*†‡#}	4
STAT 200	4 MATH 220 [*]	2
ENGL 15, 30H, or ESL 15 [†]	3 General Education Course	3
General Education Course	3 General Education Course	3
PSU 16	1 General Education Course	3
	15	15

Second Year

Fall	Credits Spring	Credits
MATH 230 [*]	4 MATH 250 or 251 [*]	3-4
MATH 311W [*]	3 MATH 312 [*]	3
CMPSC 101, 121, or 201	3 MATH 414 or STAT 414 [*]	3
General Education Course	3 General Education Course	3
	General Education Course	3
	13	15-16

Third Year

Fall	Credits Spring	Credits
MATH 415 or STAT 415 [*]	3 MATH 412 [*]	3
MATH 436 [*]	3 MATH 403 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [†]	3 MATH 411, 416, 417, 419, 421, 456, 461, MATH 467, MATH 468, MATH 479, MATH 484, MATH 485, or MATH 486 [*]	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting Course (Chosen in consultation with an academic adviser)	3 ENGL 202C, 202A, 202B, or 202D [†]	3
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
	16.5	16.5

Fourth Year

Fall	Credits Spring	Credits
MATH 455 or CMPSC 455 [*]	3 MATH 450	3
MATH 411, 416, 417, 419, 421, 456, 461, MATH 467, MATH 468, MATH 479, MATH 484, MATH 485, or MATH 486 [*]	3 MATH 411, 416, 417, 419, 421, 456, 461, MATH 467, MATH 468, MATH 479, MATH 484, MATH 485, or MATH 486 [*]	3

MATH 411, 416, 417, 419, 421, 456, 461, MATH 467, MATH 468, MATH 479, MATH 484, MATH 485, or MATH 486 [*]	3 General Education Course	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	1-2
	15	13-14

Total Credits 119-121

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Applied and Industrial Option (ALEKS Placement in MATH 21): Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year			
Fall	Credits	Spring	Credits
MATH 21	3	MATH 41	4
STAT 200	4	General Education Course	3
ENGL 15, 30H, or ESL 15 [‡]	3	General Education Course	3
General Education Course	3	General Education Course	3
PSU 16	1	General Education Course	3
14		16	
			4

Second Year		
Fall	Credits	Spring
MATH 141 ^{*‡##}	4	MATH 250 or 251 [*]
MATH 220 [*]	2	MATH 311W [*]
CMPS 131	3	MATH 230 [*]
General Education Course	3	General Education Course
		General Education Course
12		16-17

Third Year		
Fall	Credits	Spring
MATH 414 or STAT 414 [*]	3	MATH 412 [*]
MATH 436 [*]	3	MATH 415 or STAT 415 [*]
MATH 312 [*]	3	MATH 403 [*]
CAS 100, CAS 100A, CAS 100B, or CAS 100C [‡]	3	ENGL 202C, 202A, 202B, or 202D [‡]
General Education Course (GHW)	1.5	Supporting Course (Chosen in consultation with an academic adviser)
13.5		15-16

Fourth Year		
Fall	Credits	Spring
MATH 455 or CMPS 455 [*]	3	MATH 450
MATH 400-Level Selection [*]	3	MATH 400-Level Selection [*]
MATH 400-Level Selection [*]	3	MATH 400-Level Selection [*]
General Education Course (GHW)	1.5	General Education Course
Supporting Course (Chosen in consultation with an academic adviser)	3	Supporting Course (Chosen in consultation with an academic adviser)
13.5		15

Total Credits 119-121

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Applied and Industrial Option: Mathematics, B.S. at Commonwealth Campuses

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits	Spring	Credits
MATH 140 ^{*†#‡}	4	MATH 141 ^{*†#‡}	4
STAT 200	4	MATH 220 (or General Education Course) ^{*1}	2-3
ENGL 15 [‡]	3	General Education Course	3
General Education Course	3	General Education Course	3
PSU 16	1	General Education Course	3
15		15-16	

Second Year

Fall	Credits	Spring	Credits
MATH 230 [*]	4	MATH 250 or 251 [*]	3-4
MATH 220 (or General Education Course) ^{*1}	2-3	CMPSC 121 or 131	3
General Education Course	3	General Education Course	3
CAS 100	3	General Education Course	3
		Supporting Course (Chosen in consultation with an academic adviser)	3
12-13		15-16	

Third Year

Fall	Credits	Spring	Credits	Summer	Credits
MATH 311W [*]	3	MATH 312 [*]	3	MATH 400-Level Selection [*]	3
MATH 414 [*]	3	MATH 412 [*]	3		
MATH 455 [*]	3	MATH 415 [*]	3		
General Education Course	3	ENGL 202C, 202A, 202B, or 202D [‡]	3		

Supporting Course (Chosen in consultation with an academic adviser)	3	Supporting Course (Chosen in consultation with an academic adviser)	3
15		15	
3			
Fourth Year			
Fall	Credits	Spring	Credits
MATH 403 [*]	3	MATH 450 [*]	3
MATH 436 [*]	3	MATH 400-Level Selection [*]	3
MATH 400-Level Selection [*]	3	MATH 400-Level Selection [*]	3
General Education Course	3	General Education Course	3
Supporting Course (Chosen in consultation with an academic adviser)	3	Supporting Course (Chosen in consultation with an academic adviser)	1-2
15		13-14	
Total Credits 118-122			

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

¹ Semester will vary based on campus MATH 220 offerings.

University Requirements and General Education Notes:

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All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Computational Mathematics Option: Mathematics, B.S. at University Park Campus

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First Year		
Fall	Credits Spring	Credits
MATH 140 ^{*†##}	4 MATH 141 ^{*†##}	4
STAT 200	4 MATH 220 [*]	2
ENGL 15, 30H, or ESL 15 [†]	3 General Education Course	3
General Education Course	3 General Education Course	3
PSU 16	1 General Education Course	3
	15	15

Second Year		
Fall	Credits Spring	Credits
MATH 230 [*]	4 MATH 250 or 251 [*]	3-4
MATH 311W [*]	3 MATH 312 [*]	3
CMPSC 121	3 CMPSC 122	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
	General Education Course	3
	13	15-16

Third Year		
Fall	Credits Spring	Credits
MATH 414 or STAT 414 [*]	3 MATH 415 or STAT 415 [*]	3
MATH 467 [*]	3 MATH 310, 468, or 485 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [†]	3 MATH 484 [*]	3
General Education Course	3 ENGL 202C, 202A, 202B, or 202D [†]	3
Supporting Course (Chosen in consultation with an academic adviser)	3 General Education Course	3
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
	16.5	16.5

Fourth Year		
Fall	Credits Spring	Credits
MATH 455 or CMPSC 455 [*]	3 MATH 456 or CMPSC 456 [*]	3
MATH 310, 468, or 485 [*]	3 CMPSC 465 [*]	3
MATH 411, 412, or 417 [*]	3 General Education Course	3
Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	3

Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	1-2
	15	13-14

Total Credits 119-121

- * Course requires a grade of C or better for the major
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- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

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General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Computational Mathematics Option (ALEKS Placement in MATH 21): Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits Summer	Credits
MATH 21	3 MATH 41	4 MATH 140 ^{*†‡††}	4
STAT 200	4 General Education Course	3	
ENGL 15, 30H, or ESL 15 [‡]	3 General Education Course	3	
General Education Course	3 General Education Course	3	
PSU 16	1 General Education Course	3	
	14	16	4

Second Year

Fall	Credits Spring	Credits
MATH 141 ^{*†‡††}	4 MATH 230 [*]	4
MATH 220 [*]	2 MATH 311W [*]	3
General Education Course	3 CMPSC 132	3
CMPSC 131	3 General Education Course	3
Supporting Course (Chosen in consultation with an academic adviser)	3	
	15	13

Third Year

Fall	Credits Spring	Credits
MATH 250 or 251 [*]	3-4 MATH 414 or STAT 414 [*]	3
MATH 467 [*]	3 MATH 484 [*]	3
MATH 312 [*]	3 MATH 411, 412, or 417 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [‡]	3 ENGL 202C, 202A, 202B, or 202D [‡]	3

Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	2-3
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General Education Course (GHW)	1.5
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15-16

15.5-16.5

Fourth Year

Fall	Credits Spring	Credits
MATH 455 or CMPSC 455 [*]	3 MATH 456 or CMPSC 456 [*]	3
MATH 415 or STAT 415 [*]	3 CMPSC 465 [*]	3
MATH 310, 468, or 485 [*]	3 MATH 310, 468, or 485 [*]	3
General Education Course	3 General Education Course	3
General Education Course (GHW)	1.5 Supporting Course (Chosen in consultation with an academic adviser)	3
	13.5	15

Total Credits 121-123

* Course requires a grade of C or better for the major
 ‡ Course requires a grade of C or better for General Education
 # Course is an Entrance to Major requirement
 † Course satisfies General Education and degree requirement

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General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Computational Mathematics Option: Mathematics, B.S. at Commonwealth Campuses

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First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†#†}	4 MATH 141 ^{*†#†}	4
STAT 200	4 MATH 220 (or General Education Course) ^{*1}	2-3
ENGL 15 [‡]	3 General Education Course	3
General Education Course	3 General Education Course	3
PSU 16	1 General Education Course	3
	15	15-16

Second Year

Fall	Credits Spring	Credits
MATH 230 [*]	4 MATH 250 or 251 [*]	3-4
MATH 220 (or General Education Course) ^{*1}	2-3 CMPSC 122 or 132	3
CMPSC 121 or 131	3 Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting Course (Chosen in consultation with an academic adviser)	3 General Education Course	3
General Education Course	3 General Education Course	3
	15-16	15-16

Third Year

Fall	Credits Spring	Credits
MATH 311W [*]	3 MATH 312 [*]	3
MATH 414 [*]	3 MATH 415 [*]	3
MATH 484 [*]	3 MATH 310, 468, or 485 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [‡]	3 ENGL 202C, 202A, 202B, or 202D	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
	15	15

Fourth Year

Fall	Credits Spring	Credits
MATH 455 [*]	3 MATH 456 [*]	3
MATH 310, 468, or 485 [*]	3 MATH 411, 412, or 417 [*]	3
MATH 467 [*]	3 CMPSC 465 [*]	3
Supporting Course (Chosen in consultation with an academic adviser)	3 General Education Course (GHW)	1.5
General Education Course (GHW)	1.5 Supporting Course (Chosen in consultation with an academic adviser)	3

Supporting Course (Chosen in consultation with an academic adviser)	1-2
13.5	14.5-15.5

Total Credits 118-122

- * Course requires a grade of C or better for the major
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- # Course is an Entrance to Major requirement
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¹ Semester will vary based on campus MATH 220 offerings.

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All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

General Mathematics Option: Mathematics, B.S. at University Park Campus

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First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†#†}	4 MATH 141 ^{*†#†}	4
ENGL 15, 30H, or ESL 15 [†]	3 MATH 220 [*]	2
STAT 200	4 General Education Course	3
General Education Course	3 General Education Course	3
PSU 16	1 General Education Course	3
	15	15

Second Year

Fall	Credits Spring	Credits
MATH 230 [*]	4 MATH 250 or 251 [*]	3-4
MATH 311W [*]	3 MATH 312 [*]	3
General Education Course	3 CMPSC 101, 121, or 201	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
	Supporting Course (consult with an academic adviser for options)	3
	13	15-16

Third Year

Fall	Credits Spring	Credits
MATH 414 or STAT 414 [*]	3 MATH 415 or STAT 415 [*]	3
MATH 411, 412, 417, 419, or 421 [*]	3 MATH 435 or 436 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [†]	3 Area of Application Course (Consult with an academic adviser for options)	3
Area of Application (Consult with an academic adviser for options)	3 ENGL 202C, 202A, 202B, or 202D [†]	3
Supporting Course (Chosen in consultation with an academic adviser)	3 General Education Course	3
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
	16.5	16.5

Fourth Year

Fall	Credits Spring	Credits
MATH 403 [*]	3 MATH 400 Level selection: any 400 Level except MATH 401, 405, 406, 470 and 471 [*]	3
MATH 400 Level selection: any 400 Level except MATH 401, 405, 406, 470 and 471 [*]	3 Area of Application Course (Consult with an academic adviser for options)	3

Area of Application Course (Consult with an academic adviser for options)	3 Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	1-2
General Education Course	3 General Education Course	3
	15	13-14

Total Credits 119-121

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

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All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

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First Year

Fall	Credits Spring	Credits Summer	Credits
MATH 21	3 MATH 41	4 MATH 140 ^{*†#†}	4
ENGL 15, 30H, or ESL 15 [‡]	3 General Education Course	3	
STAT 200	4 General Education Course	3	
General Education Course	3 General Education Course	3	
PSU 16	1 General Education Course	3	
	14	16	4

Second Year

Fall	Credits Spring	Credits
MATH 141 ^{*†#†}	4 MATH 230 [*]	4
MATH 220 [*]	2 MATH 311W [*]	3
General Education Course	3 CMPSC 101, 131, or 201	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting Course (Chosen in consultation with an academic adviser)	3 General Education Course	3
	15	16

Third Year

Fall	Credits Spring	Credits
MATH 250 or 251	3-4 MATH 312 [*]	3
MATH 414 or STAT 414 [*]	3 MATH 415 or STAT 415 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [‡]	3 MATH 435 or 436 [*]	3

Area of Application Course (Consult with an academic adviser for options)	3 ENGL 202C, 202A, 202B, or 202D [†]	3
	Area of Application Course (Consult with an academic adviser for options)	3
12-13		15
Fourth Year		
Fall	Credits Spring	Credits
MATH 403 [*]	3 MATH Elective	3
MATH Elective	3 MATH 411, 412, 417, 419, or 421 [*]	3
Area of Application Course (Consult with an academic adviser for options)	3 Area of Application Course (Consult with an academic adviser for options)	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3-4
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
13.5		13.5-14.5

Total Credits 119-121

- * Course requires a grade of C or better for the major
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attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

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General Mathematics Option: Mathematics, B.S. at Commonwealth Campuses

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First Year		
Fall	Credits Spring	Credits
MATH 140 ^{*†#†}	4 MATH 141 ^{*†#†}	4
ENGL 15 [‡]	3 MATH 220 (or General Education Course) ^{*1}	2-3
STAT 200	4 General Education Course	3
General Education Course	3 General Education Course	3
PSU 16	1 General Education Course	3
	15	15-16

Second Year		
Fall	Credits Spring	Credits
MATH 230 [*]	4 MATH 250 or 251 [*]	3-4
MATH 220 (or General Education Course) ^{*1}	2-3 CMPSC 101, 121, 131, or 201	3
General Education Course	3 General Education Course	3
CAS 100	3 General Education Course	3
Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (consult with an academic adviser for options)	3
	15-16	15-16

Third Year		
Fall	Credits Spring	Credits
MATH 311W [*]	3 MATH 312 [*]	3
MATH 414 [*]	3 MATH 415 [*]	3
Area of Application (Consult with an academic adviser for options)	3 MATH 435 or 436 [*]	3
General Education Course	3 Area of Application Course (Consult with an academic adviser for options)	3
Supporting Course (Chosen in consultation with an academic adviser)	3 ENGL 202C, 202A, 202B, or 202D [‡]	3
	15	15

Fourth Year		
Fall	Credits Spring	Credits
MATH 403 [*]	3 MATH 400 Level Selection [*]	3
MATH 400 Level Selection [*]	3 MATH 411, 412, 417, 419, or 421	3
Area of Application Course (Consult with an academic adviser for options)	3 Area of Application Course (Consult with an academic adviser for options)	3
Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	3

General Education Course (GHW)	1.5 Supporting Course (Chosen in consultation with an academic adviser)	1-2
	General Education Course (GHW)	1.5
	13.5	14.5-15.5

Total Credits 118-122

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

¹ Semester will vary based on campus MATH 220 offerings.

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General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Graduate Study Option: Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†#†}	4 MATH 141 ^{*†#†}	4
STAT 200	4 MATH 220 [*]	2
ENGL 15, 30H, or ESL 15 [‡]	3 General Education Course	3
General Education Course	3 General Education Course	3
PSU 16	1 General Education Course	3
	15	15

Second Year

Fall	Credits Spring	Credits
MATH 230	4 MATH 250 or 251 [*]	3-4
MATH 311W [*]	3 CMPSC 101, 121, or 201	3
Natural Science	3 MATH 312 [*]	3
General Education	3 Supporting Course (Chosen in consultation with an academic adviser)	3
	Supporting Course (Chosen in consultation with an academic adviser)	3
	13	15-16

Third Year

Fall	Credits Spring	Credits
MATH 403 [*]	3 MATH 404 [*]	3
MATH 414 or STAT 414 [*]	3 MATH 415 or STAT 415 [*]	3
MATH 400 Level selection: any 400 Level except MATH 401, 405, 406, 441, 470 and 471 [*]	3 MATH 436 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [‡]	3 ENGL 202C, 202A, 202B, or 202D [‡]	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
	16.5	16.5

Fourth Year

Fall	Credits Spring	Credits
MATH 435 [*]	3 MATH 429 [*]	3
MATH 421 [*]	3 MATH 400 Level selection: any 400 Level except MATH 401, 405, 406, 470 and 471 [*]	3
MATH 400 Level selection: any 400 Level except MATH 401, 405, 406, 470 and 471 [*]	3 General Education Course	3

General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	1-2
	15	13-14

Total Credits 119-121

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Graduate Study Option (ALEKS Placement in MATH 21): Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If report**). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year			
Fall	Credits Spring	Credits Summer	Credits
MATH 21	3 MATH 41	4 MATH 140 ^{*†#†}	4
STAT 200	4 General Education Course	3	
ENGL 15, 30H, or ESL 15 [‡]	3 General Education Course	3	
General Education Course	3 General Education Course	3	
PSU 16	1 General Education Course	3	
14		16	

Second Year			
Fall	Credits Spring	Credits	
MATH 141 ^{*†#†}	4 MATH 230	4	
MATH 220 [*]	2 MATH 250 or 251 [*]	3-4	
General Education Course	3 MATH 311W [*]	3	
General Education Course	3 CMPSC 101, 131, or 201	3	
Supporting Course (Chosen in consultation with an academic adviser)	3 General Education Course	3	
15		16-17	

Third Year			
Fall	Credits Spring	Credits	
MATH 400-Level Selection [*]	3 MATH 415 or STAT 415 [*]	3	
MATH 414 or STAT 414 [*]	3 MATH 436 [*]	3	
MATH 312 [*]	3 ENGL 202C, 202A, 202B, or 202D [‡]	3	
CAS 100, CAS 100A, CAS 100B, or CAS 100C [‡]	3 MATH 400-Level Selection [*]	3	

Supporting Course (Chosen in consultation with an academic adviser)	3	
15		12
Fourth Year		
Fall	Credits Spring	Credits
MATH 403 [*]	3 MATH 404 [*]	3
MATH 421 [*]	3 MATH 429 [*]	3
MATH 435 [*]	3 MATH 400-Level Selection [*]	3
General Education Course	3 Supporting Course (Chosen in consultation with an academic adviser)	3-4
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
13.5		13.5-14.5

Total Credits 119-121

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Graduate Study Option: Mathematics, B.S. at Commonwealth Campuses

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†#†}	4 MATH 141 ^{*†#†}	4
STAT 200	4 MATH 220 (or General Education Course) ^{*1}	2-3
ENGL 15 [‡]	3 General Education Course	3
General Education Course	3 General Education Course	3
PSU 16	1 General Education Course	3
	15	15-16

Second Year

Fall	Credits Spring	Credits
MATH 230	4 MATH 250 or 251 [*]	3-4
MATH 220 (or General Education Course) ^{*1}	2-3 CMPSC 101, 121, 131, or 201	3
General Education Course	3 MATH 311W [*]	3
CAS 100	3 General Education Course	3
Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	3
	15-16	15-16

Third Year

Fall	Credits Spring	Credits
MATH 312 [*]	3 MATH 403 [*]	3
MATH 414 [*]	3 MATH 415 [*]	3
MATH 400 Level Selection [*]	3 MATH 400-Level Selection [*]	3
General Education Course	3 ENGL 202C, 202A, 202B, or 202D	3
Supporting Course (Chosen in consultation with an academic adviser)	3 General Education Course	3
	15	15

Fourth Year

Fall	Credits Spring	Credits
MATH 421 [*]	3 MATH 404 [*]	3
MATH 435 [*]	3 MATH 429 [*]	3
MATH 436 [*]	3 MATH 400 Level Selection [*]	3
General Education Course (GHW)	1.5 General Education Course (GHW)	1.5
Supporting Course (Chosen in consultation with an academic adviser)	3 Supporting Course (Chosen in consultation with an academic adviser)	3

Supporting Course (Chosen in consultation with an academic adviser)	1-2
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13.5

14.5-15.5

Total Credits 118-122

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

¹ Semester will vary based on campus MATH 220 offerings.

University Requirements and General Education Notes:

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W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Systems Analysis Option: Mathematics, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits	Spring	Credits
MATH 140 ^{*†##}	4	MATH 141 ^{*†##}	4
STAT 200	4	MATH 220 [*]	2
ENGL 15, 30H, or ESL 15 [†]	3	General Education Course	3
General Education Course	3	General Education Course	3
PSU 16	1	General Education Course	3
	15		15

Second Year

Fall	Credits	Spring	Credits
MATH 230 [*]	4	MATH 250 or 251 [*]	3-4
MATH 311W [*]	3	MATH 312 [*]	3
General Education Course	3	CMPSC 101, 121, or 201	3
General Education Course	3	Supporting Course (Chosen in consultation with an academic adviser)	3
		Supporting Course (Chosen in consultation with an academic adviser)	3
	13		15-16

Third Year

Fall	Credits	Spring	Credits
MATH 414 or STAT 414 [*]	3	MATH 415 or STAT 415 [*]	3
MATH 484 [*]	3	MATH 310, 451, 485, or 486 [*]	3
CAS 100, CAS 100A, CAS 100B, or CAS 100C [†]	3	Area of Application Course (Consult with an academic adviser for options)	3
Area of Application Course (Consult with an academic adviser for options)	3	ENGL 202C, 202A, 202B, or 202D [†]	3
Supporting Course (Chosen in consultation with an academic adviser)	3	General Education Course	3
General Education Course (GHW)	1.5	General Education Course (GHW)	1.5
	16.5		16.5

Fourth Year

Fall	Credits	Spring	Credits
MATH 436 [*]	3	MATH 400 Level selection: any 400 Level except MATH 401, 405, 406, 470 and 471 [*]	3
MATH 310, 451, 485, or 486 [*]	3	Area of Application Course (Consult with an academic adviser for options)	3

Area of Application Course (Consult with an academic adviser for options)	3	Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting Course (Chosen in consultation with an academic adviser)	3	Supporting Course (Chosen in consultation with an academic adviser)	1-2
General Education Course	3	General Education Course	3
	15		13-14

Total Credits 119-121

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
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All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Systems Analysis Option: Mathematics, B.S. at Commonwealth Campuses

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits	Spring	Credits
MATH 140 ^{*†#†}	4	MATH 141 ^{*†#†}	4
STAT 200	4	MATH 220 (or General Education Course) ^{*1}	2-3
ENGL 15 [‡]	3	General Education Course	3
General Education Course	3	General Education Course	3
PSU 16	1	General Education Course	3
	15		15-16

Second Year

Fall	Credits	Spring	Credits
MATH 230 [*]	4	MATH 250 or 251 [*]	3-4
MATH 220 (or General Education Course) ^{*1}	2-3	CMPSC 101, 121, 131, or 201	3
CAS 100	3	Supporting Course (Chosen in consultation with an academic adviser)	3
Supporting Course (Chosen in consultation with an academic adviser)	3	General Education Course	3
General Education Course	3	General Education Course	3
	15-16		15-16

Third Year

Fall	Credits	Spring	Credits
MATH 311W [*]	3	MATH 312 [*]	3
MATH 414 [*]	3	MATH 415 [*]	3
Area of Application Course (Consult with an academic adviser for options)	3	MATH 484 [*]	3
Supporting Course (Chosen in consultation with an academic adviser)	3	ENGL 202C, 202A, 202B, or 202D [‡]	3
General Education Course	3	Area of Application Course (Consult with an academic adviser for options)	3
	15		15

Fourth Year

Fall	Credits	Spring	Credits
MATH 310, 451, 485, or 486 [*]	3	MATH 400 Level Selection [*]	3
MATH 436 [*]	3	MATH 310, 451, 485, or 486 [*]	3
Area of Application Course (Consult with an academic adviser for options)	3	Area of Application Course (Consult with an academic adviser for options)	3
Supporting Course (Chosen in consultation with an academic adviser)	3	Supporting Course (Chosen in consultation with an academic adviser)	3

General Education Course (GHW)	1.5	Supporting Course (Chosen in consultation with an academic adviser)	1-2
		General Education Course (GHW)	1.5
	13.5		14.5-15.5

Total Credits 118-122

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

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† Course satisfies General Education and degree requirement

¹ Semester will vary based on campus MATH 220 offerings.

University Requirements and General Education Notes:

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Career Paths

Students with an undergraduate degree in mathematics pursue graduate study or careers in business and industry. Mathematicians may work in insurance (as actuaries), economics (as analysts), computer programming, science and engineering, the medical and legal fields, education, and other fields which require sophisticated analytical skills.

Careers

Students with an undergraduate degree in Mathematics pursue careers in the fields of science and technology, business and consulting, research and industry, and teaching.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES OF THE MATHEMATICS PROGRAM (<https://science.psu.edu/math/undergraduate/advising/careers/>)

Opportunities for Graduate Studies

Graduates of the undergraduate degree program in Mathematics often choose to continue their studies in graduate programs (MS or PhD) in

mathematics or related fields, such as statistics, economics, finance, computer science, or operations research.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES
(<https://science.psu.edu/math/undergraduate/advising/careers/>)

Professional Resources

- Mathematical Association of America (<https://www.maa.org>)
- American Mathematical Society (<https://www.ams.org/home/page/>)
- Society of Industrial and Applied Mathematics (<https://www.siam.org>)

Contact

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