STATISTICS, B.S.

Seven Penn State campuses are scheduled for closure after Spring 2027: DuBois, Fayette, New Kensington, Mont Alto, Shenango, Wilkes-Barre, and York. New students are not being admitted at these campuses.

Begin Campus: Any Penn State Campus

End Campus: University Park

Degree Requirements

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

Requirement	Credits
General Education	45
Requirements for the Major	81-93

6-12 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 0-6 credits of GN courses; 6 credits of GQ courses, 0-6 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/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/).

Common Requirements for the Major (All Options)

Code	Title	Credits
Prescribed Courses		
Prescribed Courses: Require a grade of C or better		
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
MATH 220	Matrices	2-3
MATH 230	Calculus and Vector Analysis	4
STAT 184	Introduction to R	3
STAT 200	Elementary Statistics	4
STAT 300	Statistical Modeling I	3
STAT 380	Data Science Through Statistical Reasoning and Computation	3
STAT 400	Statistical Modeling II	3
STAT/MATH 414	Introduction to Probability Theory	3
STAT/MATH 415	Introduction to Mathematical Statistics	3
STAT 470W	Capstone for Statistics Major--Problem Solving and Communication in Applied Statistics	3
Additional Courses		
Additional Courses: Require a grade of C or better		
Select 1-3 credits from the following:		1-3
STAT 480	Introduction to SAS	
STAT 481	Intermediate SAS for Data Management	
STAT 482	Advanced Topics in SAS	
STAT 483	Statistical Programming in SAS	
Requirements for the Option		
Select an option		41-50

Requirements for the Option

Actuarial Statistics Option (47 credits)

Students who major in statistics with the actuarial statistics option and who wish to complete a concurrent major in mathematics may not choose the actuarial mathematics option in mathematics. Any other option in mathematics is acceptable.

Code	Title	Credits
Prescribed Courses		
ECON 102	Introductory Microeconomic Analysis and Policy	3
ECON 104	Introductory Macroeconomic Analysis and Policy	3
Prescribed Courses: Require a grade of C or better		
ACCTG 211	Financial and Managerial Accounting for Decision Making	4
FIN 301	Corporation Finance	3
RM 302	Risk and Insurance	3
RM 410	Financial Mathematics for Actuaries	3
RM 411	Long Term Actuarial Mathematics - Fundamentals	3
RM 421	Short Term Actuarial Mathematics - Fundamentals	3
STAT 463	Applied Time Series Analysis	3
Additional Courses		
Additional Courses: Require a grade of C or better		
RM 412	Long Term Actuarial Mathematics - Advanced Topics	3
or RM 422	Short Term Actuarial Mathematics - Advanced Topics	
Select 3 credits from the following:		3
CMPSC 101	Introduction to Programming	
CMPSC 102	Introduction to Visual Programming	
CMPSC 121	Introduction to Programming Techniques	
CMPSC 131	Programming and Computation I: Fundamentals	
Select 9 credits from the following:		9
BBH/HPA 440	Principles of Epidemiology	
CMPSC 448	Machine Learning and Algorithmic AI	
IE 434	Statistical Quality Control	
IE 436	Six Sigma Methodology	
MATH 436	Linear Algebra	
or MATH 441	Matrix Algebra	
MATH/CMPSC 451	Numerical Computations	
or MATH/CMPSC 455	Introduction to Numerical Analysis I	
STAT/MATH 416	Stochastic Modeling	
STAT 440	Computational Statistics	
STAT 464	Applied Nonparametric Statistics	
STAT 466	Survey Sampling	
Supporting Courses and Related Areas		
Select 4 credits from department list		4

Applied Statistics Option (41 credits)

Code	Title	Credits
Additional Courses		
Additional Courses: Require a grade of C or better		
Select 3 credits from the following:		3
CMPSC 101	Introduction to Programming	

CMPSC 121	Introduction to Programming Techniques	
CMPSC 131	Programming and Computation I: Fundamentals	
CMPSC 201	Programming for Engineers with C++	
Select 12 credits from the following:		12
BBH/HPA 440	Principles of Epidemiology	
CMPSC 448	Machine Learning and Algorithmic AI	
IE 434	Statistical Quality Control	
IE 436	Six Sigma Methodology	
MATH 436	Linear Algebra	
or MATH 441	Matrix Algebra	
MATH/CMPSC 451	Numerical Computations	
or MATH/CMPSC 455	Introduction to Numerical Analysis I	
STAT/MATH 416	Stochastic Modeling	
STAT 440	Computational Statistics	
STAT 463	Applied Time Series Analysis	
STAT 464	Applied Nonparametric Statistics	
STAT 466	Survey Sampling	
Supporting Courses and Related Areas		
Select 26 credits from department list, including a minor in a supporting field other than Mathematics [1]		26

[1] Neither the mathematics major nor the six sigma minor, nor the risk management major with the actuarial science option may be used to satisfy the minor/concurrent major requirement. If a student wants to work in a supporting field that does not have a minor, he or she can propose a list of six appropriate courses and petition the Statistics Department for approval. It is the student's responsibility to justify the appropriateness of the proposed list. Students must receive a grade of C or better in each of these six courses.

Biostatistics Option (47-50 credits)

Code	Title	Credits
Prescribed Courses		
Prescribed Courses: Require a grade of C or better		
CHEM 110	Chemical Principles I	3
CHEM 111	Experimental Chemistry I	1
Additional Courses		
Additional Courses: Require a grade of C or better		
Select 3 credits from the following:		3
CMPSC 101	Introduction to Programming	
CMPSC 121	Introduction to Programming Techniques	
CMPSC 131	Programming and Computation I: Fundamentals	
CMPSC 201	Programming for Engineers with C++	
Select 4-5 credits from the following:		4-5
BIOL 110	Biology: Basic Concepts and Biodiversity	
BIOL 110H	Honors Biology: Basic Concepts and Biodiversity	
BIOL 114 & BIOL 115	Biology: Basic Concepts and Biodiversity - Lecture and Biology: Basic Concepts and Biodiversity - Lab	
BIOL 114 & BIOL 116	Biology: Basic Concepts and Biodiversity - Lecture and Biology: Basic Concepts and Biodiversity - FRI Lab	
Select 7-9 credits from the following:		7-9
BIOL 222	Genetics	
BIOL 220W	Biology: Populations and Communities	
or BIOL 224 & BIOL 225W	Biology: Populations and Communities - Lecture and Biology: Populations and Communities - Lab	
BIOL 230W	Biology: Molecules and Cells	
or BIOL 234 & BIOL 235W	Biology: Molecules and Cells - Lecture and Biology: Molecules and Cells - Lab	
or BIOL 234 & BIOL 236W	Biology: Molecules and Cells - Lecture and Biology: Molecules and Cells - FRI Lab	
BIOL 240W	Biology: Function and Development of Organisms	
or BIOL 244 & BIOL 245W	Biology: Function and Development of Organisms - Lecture and Biology: Function and Development of Organisms - Lab	
Select 6 credits from 400-level BIOL courses		6
Select 12 credits from the following:		12
BBH/HPA 440	Principles of Epidemiology	
CMPSC 448	Machine Learning and Algorithmic AI	
IE 434	Statistical Quality Control	
IE 436	Six Sigma Methodology	
MATH 436	Linear Algebra	
or MATH 441	Matrix Algebra	
MATH/CMPSC 451	Numerical Computations	
or MATH/CMPSC 455	Introduction to Numerical Analysis I	
STAT/MATH 416	Stochastic Modeling	
STAT 440	Computational Statistics	
STAT 463	Applied Time Series Analysis	
STAT 464	Applied Nonparametric Statistics	
STAT 466	Survey Sampling	
Supporting Courses and Related Areas		
Select 11 credits from department list		11

Graduate Study Option (41 credits)

A student completing the Graduate Study option will have earned a minor in mathematics in addition to a B.S. in Statistics. However, a student must fill out and submit the appropriate paperwork to the Mathematics Department in order for this minor to be officially recognized.

Code	Title	Credits
Prescribed Courses		
Prescribed Courses: Require a grade of C or better		
MATH 312	Concepts of Real Analysis	3
MATH 403	Classical Analysis I	3
MATH 404	Classical Analysis II	3
Additional Courses		
Additional Courses: Require a grade of C or better		
Select 3 credits from the following:		3
CMPSC 101	Introduction to Programming	
CMPSC 121	Introduction to Programming Techniques	
CMPSC 131	Programming and Computation I: Fundamentals	
CMPSC 201	Programming for Engineers with C++	
Select 9 credits from the following:		9

MATH 310	Elementary Combinatorics	
MATH 311W	Concepts of Discrete Mathematics	
MATH 421	Complex Analysis (does not require a grade of C or better)	
MATH 426	Introduction to Modern Geometry [1]	
MATH 429	Introduction to Topology [1]	
MATH/CMPSC 456	Introduction to Numerical Analysis II	
MATH 468	Mathematical Coding Theory	
Select 12 credits from the following:		12
BBH/HPA 440	Principles of Epidemiology	
CMPSC 448	Machine Learning and Algorithmic AI	
IE 434	Statistical Quality Control	
IE 436	Six Sigma Methodology	
MATH 436	Linear Algebra	
or MATH 441	Matrix Algebra	
MATH/CMPSC 451	Numerical Computations	
or MATH/ CMPSC 455	Introduction to Numerical Analysis I	
STAT/MATH 416	Stochastic Modeling	
STAT 440	Computational Statistics	
STAT 463	Applied Time Series Analysis	
STAT 464	Applied Nonparametric Statistics	
STAT 466	Survey Sampling	
Supporting Courses and Related Areas		
Select 8 credits from department list		8

[1] Course does not require a grade of C or better

Statistics and Computing Option (41 credits)

Code	Title	Credits
Prescribed Courses		
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
CMPSC 465	Data Structures and Algorithms	3
Additional Courses		
Additional Courses: Require a grade of C or better		
CMPSC 360	Discrete Mathematics for Computer Science	3
or MATH 311W	Concepts of Discrete Mathematics	
Select 9 credits from the following:		9
CMPSC 221	Object Oriented Programming with Web-Based Applications	
400-level CMPSC (other than CMPSC 451/MATH 451 or CMPSC 455/MATH 455)		
Select 12 credits from the following:		12
BBH/HPA 440	Principles of Epidemiology	
CMPSC 448	Machine Learning and Algorithmic AI	
IE 434	Statistical Quality Control	
IE 436	Six Sigma Methodology	
MATH 436	Linear Algebra	
or MATH 441	Matrix Algebra	
MATH/CMPSC 451	Numerical Computations	
or MATH/ CMPSC 455	Introduction to Numerical Analysis I	
STAT/MATH 416	Stochastic Modeling	
STAT 440	Computational Statistics	
STAT 463	Applied Time Series Analysis	
STAT 464	Applied Nonparametric Statistics	
STAT 466	Survey Sampling	
Supporting Courses and Related Areas		
Select 8 credits from department list		8

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/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/)). For more information, check the Suggested Academic Plan for your intended program.