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 (http://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.

**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 (http://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><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
<td></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 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>STAT 184</td>
<td>Introduction to R</td>
<td>1</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 380</td>
<td>Data Science Through Statistical Reasoning and Computation</td>
<td>3</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 461</td>
<td>Analysis of Variance</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 470</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
*Additional Courses: Require a grade of C or better*
Select 1-3 credits from:

- 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: 47-57

Requirements for the Option
Actuarial Statistics Option (53 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 104</td>
<td>Introductory Macroeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>RM 302</td>
<td>Risk and Insurance</td>
<td>3</td>
</tr>
<tr>
<td>RM 410</td>
<td>Financial Mathematics for Actuaries</td>
<td>3</td>
</tr>
<tr>
<td>RM 411</td>
<td>Actuarial Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>RM 412</td>
<td>Actuarial Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 463</td>
<td>Applied Time Series Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better
Select one of the following: 3

- CMPSC 101 Introduction to Programming
- CMPSC 102 Introduction to Visual Programming
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 200 Programming for Engineers with MATLAB
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202

Select three of the following: 9

- IE 434 Statistical Quality Control
- IE 436 Six Sigma Methodology
- MATH 436 Linear Algebra
- MATH 451 Numerical Computations
- STAT 416 Stochastic Modeling
- STAT 440 Computational Statistics
- STAT 464 Applied Nonparametric Statistics
- STAT 466 Survey Sampling

Supporting Courses and Related Areas
Select 13 credits from department list, including a minor in a supporting field other than Mathematics

Biostatistics Option (56-57 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better
Select one of the following: 3

- CMPSC 101 Introduction to Programming
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 201 Programming for Engineers with C++
- CMPSC 202

Select two of the following: 7-8

- BIOL 220W Biology: Populations and Communities
- BIOL 222 Genetics
- BIOL 230W Biology: Molecules and Cells
- BIOL 240W Biology: Function and Development of Organisms

Select 6 credits from 400-level BIOL courses

Select four of the following: 12

- IE 434 Statistical Quality Control
- IE 436 Six Sigma Methodology
- MATH 436 Linear Algebra
Statistics, B.S.

**Prescribed Courses**
- **Prescribed Courses: Require a grade of C or better**
  - MATH 312: Concepts of Real Analysis 3 credits
  - MATH 403: Classical Analysis I 3 credits
  - MATH 404: Classical Analysis II 3 credits

**Additional Courses**
- **Additional Courses: Require a grade of C or better**
  - Select one of the following: 3 credits
    - CMPSC 101: Introduction to Programming
    - CMPSC 121: Introduction to Programming Techniques
    - CMPSC 201: Programming for Engineers with C++
    - CMPSC 202
  - Select three of the following: 9 credits
    - MATH 310: Elementary Combinatorics
    - MATH 311W: Concepts of Discrete Mathematics
    - MATH 421: Complex Analysis (does not require a grade of C or better)
    - MATH 422: Wavelets and Fourier Analysis: Theory and Applications
    - MATH 426: Introduction to Modern Geometry (does not require a grade of C or better)
    - MATH 429: Introduction to Topology (does not require a grade of C or better)
    - MATH 456: Introduction to Numerical Analysis II
    - MATH 468: Mathematical Coding Theory
  - Select four of the following: 12 credits
    - IE 434: Statistical Quality Control
    - IE 436: Six Sigma Methodology
    - MATH 436: Linear Algebra
    - or MATH 441: Matrix Algebra
    - MATH 451: Numerical Computations
    - or MATH 455: Introduction to Numerical Analysis I
    - STAT 416: Stochastic Modeling
    - STAT 440: Computational Statistics
    - STAT 463: Applied Time Series Analysis
    - STAT 464: Applied Nonparametric Statistics

**Supporting Courses and Related Areas**
- Select 14 credits from department list 14 credits

**Statistics and Computing Option (47 credits)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**
- **Additional Courses: Require a grade of C or better**
  - CMPSC 360: Discrete Mathematics for Computer Science 3 credits
  - Select 9 credits of the following: 9 credits
    - CMPSC 221: Object Oriented Programming with Web-Based Applications
  - Select four of the following: 12 credits
    - IE 434: Statistical Quality Control
    - IE 436: Six Sigma Methodology
    - MATH 436: Linear Algebra
    - or MATH 441: Matrix Algebra
    - MATH 451: Numerical Computations
    - or MATH 455: Introduction to Numerical Analysis I
    - STAT 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 14 credits from department list 14 credits