DATA SCIENCES, B.S. (SCIENCE)

Begin Campus: Any Penn State Campus
End Campus: University Park

Degree Requirements
For the Bachelor of Science degree in Data Sciences, a minimum of 125 credits is required (at least 18 credits must be taken at the 400 level):

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>5-14</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>72-81</td>
</tr>
</tbody>
</table>

6 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 6 credits of GQ courses.

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.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 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 (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>DS 220</td>
<td>Data Management for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 300</td>
<td>Privacy and Security for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 340W</td>
<td>Applied Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>DS 440</td>
<td>Data Sciences Capstone Course</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2</td>
</tr>
<tr>
<td>STAT 184</td>
<td>Introduction to R</td>
<td>2</td>
</tr>
<tr>
<td>STAT 380</td>
<td>Data Science Through Statistical Reasoning and Computation</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
1 credit of First-Year Seminar

Common Courses:
Prescribed Courses: Require a grade of C or better
Additional Courses: Require a grade of C or better

CMPS 121  Introduction to Programming Techniques  3
  or CMPS 131  Programming and Computation I: Fundamentals
CMPS 122  Intermediate Programming  3
  or CMPS 132  Programming and Computation II: Data Structures
STAT/MATH 318  Elementary Probability  3
  or STAT/MATH 414  Introduction to Probability Theory

Requirements for the Option
Select an option  35-44

Requirements for the Option
Statistical Modeling Data Sciences (DTSCS_BS): 35 credits
Only Available through the Eberly College of Science

Code  Title  Credits

Prescribed Courses

Prescribed Courses: Require a grade of C or better
MATH 230  Calculus and Vector Analysis  4
STAT 415  Introduction to Mathematical Statistics  3
STAT 440  Computational Statistics  3
STAT 462  Applied Regression Analysis  3

Additional Courses

Additional Courses: Require a grade of C or better
DS 200  Introduction to Data Sciences  4
  or STAT 200  Elementary Statistics
DS 310  Machine Learning for Data Analytics  3
  or CMPS 448  Machine Learning and Algorithmic AI
MATH 311W  Concepts of Discrete Mathematics  3
  or CMPS 360  Discrete Mathematics for Computer Science

Supporting Courses and Related Areas
Select 6 credits from Quantitative Modeling Option List A courses, see Appendix D  6
Select 6 credits from Quantitative Modeling Option List B courses, see Appendix D  6

Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF STATISTICAL MODELING DATA SCIENCES COURSES (p. )

Applied Data Sciences (DATSC_BS): 38 credits
Only Available through the College of Information Sciences and Technology

Code  Title  Credits

Prescribed Courses

Prescribed Courses: Require a grade of C or better
DS 200  Introduction to Data Sciences  4
DS 310  Machine Learning for Data Analytics  3
DS 320  Data Integration  3
DS 330  Visual Analytics for Data Sciences  3
DS 410  Programming Models for Big Data  3
IST 230  Language, Logic, and Discrete Mathematics  3
IST 495  Internship  1

Additional Courses
Select 6 credits from any combination:  6
DS 402  Emerging Trends in the Data Sciences
DS 442  Artificial Intelligence

Computational Data Sciences (DTSCS_BS): 44 credits
Only Available through the College of Engineering

Code  Title  Credits

Prescribed Courses

Prescribed Courses: Require a grade of C or better
CMPS 448  Machine Learning and Algorithmic AI  3
CMPS 221  Object Oriented Programming with Web-Based Applications  3
CMPS 360  Discrete Mathematics for Computer Science  3
CMPS 442  Artificial Intelligence  3
CMPS 455  Introduction to Numerical Analysis I  3
CMPS 465  Data Structures and Algorithms  3
DS 410  Programming Models for Big Data  3
MATH 230  Calculus and Vector Analysis  4
STAT 415  Introduction to Mathematical Statistics  3

Additional Courses

Additional Courses: Require a grade of C or better
DS 200  Introduction to Data Sciences  4
  or STAT 200  Elementary Statistics

Supporting Courses and Related Areas
Select 6 credits from Applied Option List A in Appendix D  6
Select 6 credits from Applied Option List B in Appendix D  6

Students may apply up to 3 credits of ROTC as option list credits and 3 credits of ROTC as GHW credits.

LIST OF COMPUTATIONAL DATA SCIENCES COURSES (http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx)