DATA SCIENCES, B.S.  
(INFORMATION SCIENCES AND TECHNOLOGY)

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 (http://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>D3 220</td>
<td>Data Management for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>D3 300</td>
<td>Privacy and Security for Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>D3 340W</td>
<td>Applied Data Sciences</td>
<td>3</td>
</tr>
<tr>
<td>D3 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 1
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
Applied Data Sciences (DATSC_BS): 38 credits
Only Available through the College of Information Sciences and Technology

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
IST 441 Information Retrieval and Organization
IST 442 Information Technology in an International Context
IST 445 Globalization Trends and World Issues
IST 462 Database Modeling and Applications
SODA 308 Research Design for Social Data Analytics

Supporting Courses and Related Areas
Select 12 credits from the lists of Application Focus courses in Appendix B; 6 credits must be at the 400 level. 12

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

LIST OF APPLIED DATA SCIENCES COURSES

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

Prescribed Courses
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

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

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

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 1
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

1 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 (http://bulletins.psu.edu/undergraduate/colleges/eberly-science/data-sciences-bs/#suggestedacademicplantext)