

DATA SCIENCES, B.S. (ENGINEERING)

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):

Requirement	Credits
General Education	45
Electives	5-14
Requirements for the Major	72-81

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)

Code	Title	Credits
Prescribed Courses		
<i>Prescribed Courses: Require a grade of C or better</i>		
DS 220	Data Management for Data Sciences	3
DS 300	Privacy and Security for Data Sciences	3
DS 340W	Applied Data Sciences	3
DS 440	Data Sciences Capstone Course	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
MATH 220	Matrices	2
STAT 184	Introduction to R	2
STAT 380	Data Science Through Statistical Reasoning and Computation	3
Additional Courses		
1 credit of First-Year Seminar		1

<i>Additional Courses: Require a grade of C or better</i>		
CMPSC 121	Introduction to Programming Techniques	3
or CMPSC 131	Programming and Computation I: Fundamentals	
CMPSC 122	Intermediate Programming	3
or CMPSC 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**Computational Data Sciences (DTSCE_BS): 44 credits
Only Available through the College of Engineering**

Code	Title	Credits
Prescribed Courses		
CMPSC 448	Machine Learning and Algorithmic AI	3
<i>Prescribed Courses: Require a grade of C or better</i>		
CMPSC 221	Object Oriented Programming with Web-Based Applications	3
CMPSC 360	Discrete Mathematics for Computer Science	3
CMPSC 442	Artificial Intelligence	3
CMPSC 455	Introduction to Numerical Analysis I	3
CMPSC 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 Areas¹

Select 6 credits from Applied Option List A in Appendix D	6
Select 6 credits from Applied Option List B in 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 COMPUTATIONAL DATA SCIENCES COURSES (<http://www.eecs.psu.edu/students/undergraduate/Data-Sciences.aspx>)

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

Code	Title	Credits
Prescribed Courses		
<i>Prescribed Courses: Require a grade of C or better</i>		
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 Areas¹

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

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

LIST OF APPLIED DATA SCIENCES COURSES (<http://bulletins.psu.edu/undergraduate/colleges/information-sciences-technology/data-sciences-bs/#suggestedacademicplantext>)

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

Code	Title	Credits
Prescribed Courses		
<i>Prescribed Courses: Require a grade of C or better</i>		
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 CMPSC 448	Machine Learning and Algorithmic AI	
MATH 311W	Concepts of Discrete Mathematics	3
or CMPSC 360	Discrete Mathematics for Computer Science	

Supporting Courses and Related Areas¹

Select 6 credits from Quantitative Modeling Option List A courses, see Appendix D

Select 6 credits from Quantitative Modeling Option List B courses, see Appendix D

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>)