

DATA SCIENCE, B.A.

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (<http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext>) section of the *Guide*.

General Education	<ul style="list-style-type: none"> • Breadth—Humanities/Literature/Arts: 6 credits • Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits • Breadth—Social Studies: 3 credits • Communication Part A & Part B * • Ethnic Studies * • Quantitative Reasoning Part A & Part B *
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* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF ARTS (B.A.)

Students pursuing a bachelor of arts degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either a bachelor of arts or a bachelor of science curriculum.

BACHELOR OF ARTS DEGREE REQUIREMENTS

Mathematics Complete the University General Education Requirements for Quantitative Reasoning A (QR-A) and Quantitative Reasoning B (QR-B) coursework.

Foreign Language	<ul style="list-style-type: none"> • Complete the fourth unit of a foreign language; OR • Complete the third unit of a foreign language and the second unit of an additional foreign language.
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L&S Breadth	<ul style="list-style-type: none"> • 12 credits of Humanities, which must include 6 credits of literature; and • 12 credits of Social Science; and • 12 credits of Natural Science, which must include one 3+ credit Biological Science course and one 3+ credit Physical Science course.
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Liberal Arts and Science Coursework	Complete at least 108 credits.
Depth of Intermediate/Advanced work	Complete at least 60 credits at the intermediate or advanced level.
Major	Declare and complete at least one major.
Total Credits	Complete at least 120 credits.
UW-Madison Experience	<ul style="list-style-type: none"> • 30 credits in residence, overall; and • 30 credits in residence after the 86th credit.
Quality of Work	<ul style="list-style-type: none"> • 2.000 in all coursework at UW–Madison • 2.000 in Intermediate/Advanced level coursework at UW–Madison

NON–L&S STUDENTS PURSUING AN L&S MAJOR

Non–L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

REQUIREMENTS FOR THE MAJOR

Code	Title	Credits
Foundational Math Courses		
MATH 221	Calculus and Analytic Geometry 1	5
or MATH 217	Calculus with Algebra and Trigonometry II	
or MATH 275	Topics in Calculus I	
MATH 222	Calculus and Analytic Geometry 2	4
or MATH 276	Topics in Calculus II	

Code	Title	Credits
Foundational Data Science Courses		
STAT 240	Data Science Modeling I	4
STAT 340	Data Science Modeling II	4
COMP SCI 220	Data Science Programming I	4
or COMP SCI 300	Programming II	
COMP SCI 320	Data Science Programming II	4
L I S 461	Data and Algorithms: Ethics and Policy	3-4

Code	Title	Credits
Electives		
18		
Students must complete at least one course from each of the four following categories and then additional electives to reach the minimum credits. Additional courses taken within each category may count towards other electives.		

<i>Machine Learning</i>		3
Complete one of the following:		
COMP SCI/E C E/ M E 532	Matrix Methods in Machine Learning	
COMP SCI/E C E/ M E 539	Introduction to Artificial Neural Networks	
COMP SCI 540	Introduction to Artificial Intelligence	

GEN BUS 656	Machine Learning for Business Analytics
MATH 535	Mathematical Methods in Data Science
STAT 451	Introduction to Machine Learning and Statistical Pattern Classification
STAT 453	Introduction to Deep Learning and Generative Models
<i>Advanced Computing</i> 3	
Complete one of the following:	
COMP SCI 400	Programming III
COMP SCI 412	Introduction to Numerical Methods
COMP SCI/ STAT 471	Introduction to Computational Statistics
COMP SCI/ MATH 513	Numerical Linear Algebra
COMP SCI/ MATH 514	Numerical Analysis
COMP SCI/E C E/ I SY E 524	Introduction to Optimization
COMP SCI 564	Database Management Systems: Design and Implementation
COMP SCI/ B M I 576	Introduction to Bioinformatics
GEOG 573	Advanced Geocomputing and Geospatial Big Data Analytics
GEOG 574	Geospatial Database Design and Development
<i>Statistical Modeling</i> 3	
Complete one of the following:	
ECON 400	Introduction to Applied Econometrics
ECON 410	Introductory Econometrics
STAT/MATH 309	Introduction to Probability and Mathematical Statistics I
STAT/MATH 310	Introduction to Probability and Mathematical Statistics II
STAT 311	Introduction to Theory and Methods of Mathematical Statistics I
STAT 312	Introduction to Theory and Methods of Mathematical Statistics II
STAT 349	Introduction to Time Series
STAT 351	Introductory Nonparametric Statistics
STAT 421	Applied Categorical Data Analysis
STAT/M E 424	Statistical Experimental Design
STAT/MATH 431	Introduction to the Theory of Probability
STAT 443	Classification and Regression Trees
STAT 456	Applied Multivariate Analysis
STAT 461	Financial Statistics
MATH 531	Probability Theory
MATH/I SY E/ OTM/STAT 632	Introduction to Stochastic Processes

MATH 635	An Introduction to Brownian Motion and Stochastic Calculus
<i>Linear Algebra</i> 3	
Complete one from the following:	
MATH 320	Linear Algebra and Differential Equations
MATH 340	Elementary Matrix and Linear Algebra
MATH 341	Linear Algebra
MATH 375	Topics in Multi-Variable Calculus and Linear Algebra
<i>Other Electives</i> 6	
For additional electives students may complete courses from the list below or additional courses from the required categories above:	
COMP SCI/I SY E/ MATH 425	Introduction to Combinatorial Optimization
COMP SCI/I SY E/ MATH/STAT 525	Linear Optimization
COMP SCI/ E C E 533	Image Processing
COMP SCI 559	Computer Graphics
COMP SCI/ B M I 567	Medical Image Analysis
COMP SCI 577	Introduction to Algorithms
E C E 203	Signals, Information, and Computation
ECON 315	Data Visualization for Economists
ECON 570	Fundamentals of Data Analytics for Economists
ECON 695	Topics in Economic Data Analysis
GEOG 572	Graphic Design in Cartography
GEOG 575	Interactive Cartography & Geovisualization
I SY E 323	Operations Research-Deterministic Modeling
I SY E 412	Fundamentals of Industrial Data Analytics
I SY E/M E 512	Inspection, Quality Control and Reliability
I SY E 575	Introduction to Quality Engineering
I SY E 612	Information Sensing and Analysis for Manufacturing Processes
L I S 407	Data Storytelling with Visualization
L I S 464	Applied Database Design
L I S 501	Introduction to Text Mining
SOC 351	Introduction to Survey Methods for Social Research
SOC/ C&E SOC 693	Practicum in Analysis and Research
STAT 433	Data Science with R

RESIDENCE & QUALITY OF WORK

- 2.000 GPA in all major courses
- 2.000 GPA in all upper level work in the major¹
- 15 credits in the major, taken on the UW-Madison campus

FOOTNOTES

1

Upper-level in the major includes L I S 461 and all courses listed in the Data Science Electives (i.e. Machine Learning, Advanced Computing, Statistical Modeling, Linear Algebra, and Other Electives).

UNIVERSITY DEGREE REQUIREMENTS

Total Degree To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

Residency Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.

Quality of Work Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.