DATA SCIENCE, B.S.

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/#requirementsforundergraduatetext) section of the Guide.

General Education

- 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 *
* 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 SCIENCE (B.S.)

Students pursuing a Bachelor of Science 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 the Bachelor of Arts or the Bachelor of Science degree requirements.

BACHELOR OF SCIENCE DEGREE REQUIREMENTS

Mathematics
Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.

Foreign Language
Complete the third unit of a foreign language.

L&S Breadth
Complete:
- 12 credits of Humanities, which must include at least 6 credits of Literature; and
- 12 credits of Social Science; and
- 12 credits of Natural Science, which must include 6 credits of Biological Science and 6 credits of Physical Science.

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 221</td>
<td>Calculus and Analytic Geometry 1</td>
<td>5</td>
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<tr>
<td>or MATH 217</td>
<td>Calculus with Algebra and Trigonometry II</td>
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<tr>
<td>or MATH 275</td>
<td>Topics in Calculus I</td>
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<td>MATH 222</td>
<td>Calculus and Analytic Geometry 2</td>
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<tr>
<td>or MATH 276</td>
<td>Topics in Calculus II</td>
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<tbody>
<tr>
<td>STAT 240</td>
<td>Introduction to Data Modeling I</td>
<td>4</td>
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<tr>
<td>STAT 340</td>
<td>Introduction to Data Modeling II</td>
<td>4</td>
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<tr>
<td>COMP SCI 220</td>
<td>Data Science Programming I</td>
<td>4</td>
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<tr>
<td>or COMP SCI 300</td>
<td>Programming II</td>
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<tr>
<td>COMP SCI 320</td>
<td>Data Science Programming II</td>
<td>4</td>
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<tr>
<td>L I S 461</td>
<td>Data and Algorithms: Ethics and Policy</td>
<td>3-4</td>
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<th>Code</th>
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<tr>
<td>COMP SCI/E C E/ M E 532</td>
<td>Matrix Methods in Machine Learning</td>
<td>1</td>
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<tr>
<td>COMP SCI/E C E/ M E 539</td>
<td>Introduction to Artificial Neural Networks</td>
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</tr>
<tr>
<td>COMP SCI 540</td>
<td>Introduction to Artificial Intelligence</td>
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</table>
Mathematical Methods in Data Science
Introduction to Machine Learning and Statistical Pattern Classification
Introduction to Deep Learning and Generative Models

MATH 535
STAT 451
STAT 453

Advanced Computing
Complete one of the following:

COMP SCI 400
COMP SCI 412
COMP SCI/STAT 471
COMP SCI/MATH 513
COMP SCI/MATH 514
COMP SCI/ECE/I SYE 524
COMP SCI 564
GEOG 573
GEOG 574

Numerical Linear Algebra
Introduction to Numerical Methods
Introduction to Computational Statistics
Introduction to Optimization
Database Management Systems: Design and Implementation
Advanced Geocomputing and Geospatial Big Data Analytics
Geospatial Database Design and Development

STAT 451
Introduction to Machine Learning and Statistical Pattern Classification

Introduction to Deep Learning and Generative Models

STAT 453
Introduction to Deep Learning and Generative Models

MATH 535

Mathematical Methods in Data Science

MATH 535

Mathematical Methods in Data Science

Other Electives
For additional electives students may complete courses from the list below or additional courses from the required categories above:

ECE 203
Signals, Information, and Computation
ECON 570
Fundamentals of Data Analytics for Economists
GEOG 572
Graphic Design in Cartography
GEOG 575
Interactive Cartography & Geovisualization
I SYE 323
Operations Research-Deterministic Modeling
I SYE 412
Fundamentals of Industrial Data Analytics
I SYE/M 512
Inspection, Quality Control and Reliability
I SYE 575
Introduction to Quality Engineering
I SYE 612
Information Sensing and Analysis for Manufacturing Processes
COMP SCI/I SYE/MATH 425
Introduction to Combinatorial Optimization
COMP SCI/I SYE/MATH/STAT 525
Linear Optimization
COMP SCI/ECE 533
Image Processing
COMP SCI 559
Computer Graphics
COMP SCI/BMI 567
Medical Image Analysis
COMP SCI 577
Introduction to Bioinformatics
COMP SCI/BMI 576
Introduction to Algorithms
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

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

1 Students who take COMP SCI/ECE/M 532 may count the course towards both their linear algebra and machine learning requirements.
However, students should be aware that some elective courses, in MATH in particular, require linear algebra courses as a prerequisite.

Upper-level in the major includes LIS 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.