

DATA SCIENCE, CERTIFICATE

Students in the Data Science certificate will develop abilities such as data management, reproducibility, modeling strategies, and ethical considerations of data science to be paired with their knowledge gained from their major or domain area. The certificate is a great fit for students who like programming, want to learn data analysis, and seek to be high-end users of data science tools in domain areas. Data science is one of the fastest growing career sectors in Wisconsin and across the nation.

By its very nature, the field of data science is one that teaches novel and cutting-edge ways to engage in the “continual sifting and winnowing by which alone the truth can be found.”

HOW TO GET IN

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Students are eligible to declare the certificate at any point in their studies, however they should declare it as early as possible to plan the required coursework. See the departmental website (<https://stat.wisc.edu/data-science-certificate/>) for information about how to declare.

Students declared in the Data Science major or the Certificate in Engineering Data Analytics are not eligible to declare the Certificate in Data Science.

REQUIREMENTS

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The certificate requires a minimum of 16 credits.

Code	Title	Credits
Foundation Courses		10-12
<i>Complete two programming courses from</i>		<i>7-8</i>
COMP SCI 220	Data Science Programming I ¹	
	or COMP SCI 320 Data Science Programming II	
STAT 240	Data Science Modeling I	
E C E 204	Data Science & Engineering	
<i>Complete one ethics course from</i>		<i>3-4</i>
L I S 461	Data and Algorithms: Ethics and Policy (4-credit Communication B optional)	
	or E C E/ I SY E 570 Ethics of Data for Engineers	
Elective Courses		6
Complete a minimum of 6 credits of electives, including at least 3 credits from the Fundamental Electives list.		
<i>Fundamental Electives</i>		<i>3-6</i>
ACT SCI 654	Regression and Time Series for Actuaries	
ACT SCI 655	Health Analytics	
ACT SCI 657	Risk Analytics	

BIOCORE 382	Evolution, Ecology, and Genetics Laboratory
BIOCORE 384	Cellular Biology Laboratory
BIOCORE 486	Principles of Physiology Laboratory
BSE 405	Artificial Intelligence in Agriculture
CHEM 361	Machine Learning in Chemistry
CIV ENGR 516	Hydrologic Data Analysis
COMP SCI 320	Data Science Programming II ¹
COMP SCI/E C E/ M E 532	Matrix Methods in Machine Learning
COMP SCI 544	Introduction to Big Data Systems
COMP SCI 565	Introduction to Data Visualization
COMP SCI/ B M I 576	Introduction to Bioinformatics
ECON 315	Data Visualization for Economists
ECON 400	Introduction to Applied Econometrics
ECON 410	Introductory Econometrics
ECON 460	Economic Forecasting
ECON 570	Fundamentals of Data Analytics for Economists
ECON 695	Topics in Economic Data Analysis
ED PSYCH 551	Quantitative Ethnography
FINANCE 310	Data Analytics for Finance
F&W ECOL 395	Data and GIS Tools for Ecology
F&W ECOL 458	Environmental Data Science
GEOG 378	Introduction to Geocomputing
GEOG 560	Advanced Quantitative Methods
GEOG 573	Advanced Geocomputing and Geospatial Big Data Analytics
GEOG 574	Geospatial Database Design and Development
GEOG 579	GIS and Spatial Analysis
I SY E 412	Fundamentals of Industrial Data Analytics
I SY E 521	Machine Learning in Action for Industrial Engineers
INFO SYS 423	Digital Platform Analytics
MATH 444	Graphs and Networks in Data Science
MATH 535	Mathematical Methods in Data Science
MATH 616	Data-Driven Dynamical Systems, Stochastic Modeling and Prediction
PHYSICS 361	Machine Learning in Physics
SOC 362	Statistics for Sociologists III
SOIL SCI 585	Using R for Soil and Environmental Sciences
STAT 340	Data Science Modeling II
STAT 405	Data Science Computing Project
STAT 436	Statistical Data Visualization
STAT/ COMP SCI 471	Introduction to Computational Statistics

Domain Electives

0-3

A A E/ECON 421	Economic Decision Analysis
COMP SCI/E C E/ I SY E 524	Introduction to Optimization
COMP SCI 541	Theory & Algorithms for Data Science
GEN BUS 307	Business Analytics II
INFO SYS 322	Introduction to Databases
L I S 407	Data Storytelling with Visualization
L I S 440	Navigating the Data Revolution: Concepts of Data & Information Science
LSC 460	Social Media Analytics
LSC 660	Data Analysis in Communications Research
SOC 351	Introduction to Survey Methods for Social Research
SOC/ C&E SOC 365	Data Management for Social Science Research
SOC/ C&E SOC 618	Social Network Analysis

RESIDENCE AND QUALITY OF WORK

- Minimum 2.000 GPA on all certificate courses
- At least 9 credits must be taken in residence at UW-Madison

FOOTNOTES

¹ COMP SCI 320 may count toward either the Foundation Courses or Fundamental Electives requirement, but not both.

CERTIFICATE COMPLETION REQUIREMENT

This undergraduate certificate must be completed concurrently with the student's undergraduate degree. Students cannot delay degree completion to complete the certificate.

LEARNING OUTCOMES

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1. Apply tools and processes necessary for data management and reproducibility.
2. Produce meaning from data employing modeling strategies.
3. Learn best practices related to data science concepts and methods.
4. Articulate policy, privacy, security and ethical considerations in data science projects.

ADVISING AND CAREERS

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Students who are interested in Data Science academic advising should check out the advising information on our website (<https://stat.wisc.edu/data-science-certificate/>) or send an email to dscert@stat.wisc.edu.

WHAT DO DATA SCIENTISTS DO?

Data scientists are trained to manage, process, model, gain meaning and knowledge, and present data. These skills can be employed in a wide variety of different sectors of employment. Examples of interests of our students include finance, banking, sports analytics, marketing, retail, humanities, psychology, biosciences, healthcare, and consulting, just to name a few. Students are encouraged to combine Data Science with majors, certificates, and courses from differing areas to best be able to apply their data science in the area of their choosing.

Data science is one of the fastest-growing areas of jobs in the United States and in Wisconsin. The Occupational Outlook Handbook (OOH) from the Bureau of Labor Statistics (<https://www.bls.gov/ooh/math/data-scientists.htm>) shows the job growth outlook from 2023-33 for Data Scientists to be 36% (much faster than average).

Some students may want to continue to develop additional advanced data science skills through graduate education.

SUCCESSWORKS

SuccessWorks (<https://successworks.wisc.edu/>) at the College of Letters & Science helps you turn the academic skills learned in your classes into a fulfilling life, guiding you every step of the way to securing jobs, internships, or admission to graduate school.

Through one-on-one career advising, events, and resources, you can explore career options, build valuable internship and research experience, and connect with supportive alumni and employers who open doors of opportunity.

- What you can do with your major (<https://successworks.wisc.edu/what-you-can-do-with-your-major/>) (Major Skills & Outcomes Sheets)
- Make a career advising appointment (<https://successworks.wisc.edu/make-an-appointment/>)
- Learn about internships and internship funding (<https://successworks.wisc.edu/finding-a-job-or-internship/>)
- Try "Jobs, Internships, & How to Get Them," (<https://successworks.wisc.edu/canvas/>) an interactive guide in Canvas for enrolled UW-Madison students