Data Science (BA/BS)

The volume, rate, and importance of data is growing exponentially, with more data being created in the past two years than in all history combined. At the University of Oregon we're bringing our strengths as a liberal arts university to the field – to not only ask what can we do with data – but what should we do.

As a data science major at the UO, you will learn key computational, statistical, and inferential data science skills side-by-side with applied knowledge in one of 10 different areas: accounting analytics, biology, earth science, economics, geography, linguistics, marketing analytics, music technology, physics, and sociology. Our unique interdisciplinary program teaches you how to extract knowledge and insight from data, empowering you to make decisions earlier, faster, better. When you graduate, your understanding of applied data science techniques, framed within the liberal arts, will help launch you directly into the workforce.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Demonstrate the ability to assess data set quality, identifying and rectifying potential errors in such a way so as to lead to statistically meaningful derived information.
- Visualize complex data sets using descriptive statistics and graphs.
- Demonstrate understanding of basic regression, optimization, prediction, simulation, and visualization methods.
- Use critical thinking skills to translate substantive questions into well-defined statistical or probability problems and choose the appropriate graphical or numerical descriptive and/or inferential statistical techniques for a given problem, leading to actionable, valid, and meaningful conclusions.
- Develop successful strategies for formulating and testing hypotheses about data.
- Demonstrate an understanding of ethical, legal, societal, and economic concerns.
- Apply fundamental concepts of data science (data management, statistical prediction and inference, experimental design, etc.) to applications specific to the chosen specialization domain.

Data Science Major Requirements

Courses used to fulfill the major requirements must be taken for a letter grade and passed with a grade of C- or better.

The data science curriculum combines general principles with domain-specific application. The curriculum is sub-divided into the following categories with the corresponding requirements:

Code	Title	Credits
Data Science Core Courses		
DSCI 101	Foundations of Data Science I	4
DSCI 102	Foundations of Data Science II	4
DSCI 311	Principles and Techniques of Data Science	4
Foundations in Mathematics and Computing		
CS 210 & CS 211 & CS 212	Computer Science I and Computer Science II and Computer Science III	12
MATH 251Z & MATH 252Z	Differential Calculus and Integral Calculus	8
MATH 341 & MATH 342	Elementary Linear Algebra and Elementary Linear Algebra	8
Probability		
DSCI/MATH 345M	Probability and Statistics for Data Science	4
Modeling, Learning and Decision Making		
DSCI/CS 372M	Machine Learning for Data Science	4
Ethics Course		
PHIL 223	Data Ethics	4
Computational and Inferential Depth		
Select three courses from the list below:		12
CS 314	Computer Organization	
CS 322	Introduction to Software Engineering	
CS 330	C/C++ and Unix	
CS 333	Applied Cryptography	
CS 415	Operating Systems	
CS 432	Introduction to Networks	
MATH 253Z	Calculus: Sequences and Series	
MATH 307	Introduction to Proof	
MATH 461	Introduction to Mathematical Methods of Statistics I	
MATH 462	Introduction to Mathematical Methods of Statistics II	
MATH 463	Mathematical Methods of Regression Analysis and Analysis of Variance	
MATH 458	Introduction to Mathematical Cryptography	
DSCI 401	Research: [Topic] [1]	
DSCI 404	Internship: [Topic] [1]	
Domain Emphasis		**23-31**
Total Credits		**87-95**

[1] 4 credits between DSCI 401 and DSCI 404 can collectively count for only one CID elective.

Domain Emphasis

The domain emphasis consists of completing 2-3 courses (8-15 credits) in the domain core, followed by a minimum of 4 courses (16 credits) of domain specialization. For each domain emphasis, a curated list of courses has been developed for both the core and specialization component. Please see the Concentrations tab (https://catalog.uoregon.edu/archive/2025-2026/arts-sciences/school-computer-data-sciences/data-science/ug-data-science/#concentrationstext) for a detailed list of courses that satisfy each available domain emphasis.

Residency Requirements

At least 34 credits of coursework applied to the major must be taken at the University of Oregon. These credits must include enrollment in DSCI 311, DSCI 345, and DSCI 372.

An essential aspect of the degree in data science is that data science majors develop critical competencies in a domain emphasis of their choosing. The domain emphasis consists of completing 2-3 courses (8-12 credits) in the domain core, followed by a minimum of 3 courses (12 credits) of domain specialization. For each domain emphasis, a curated

list of courses has been developed for both the core and specialization component.

Currently, domain emphases have been established for biology, geography, accounting analytics, marketing analytics, and linguistics. The curated list of domain core and domain specialization courses for each domain is outlined below.

- Accounting Analytics (p. 2)
- Biology (p. 2)
- Cultural Analytics (p. 2)
- Earth Sciences (p. 3)
- Economics (p. 3)
- Geography (p. 3)
- Linguistics (p. 3)
- Marketing Analytics (p. 4)
- Music Technology (p. 4)
- Physics (p. 4)
- Sociology (p. 4)

Data Science Domain - Accounting Analytics

Data has proliferated in business as organizations generate large volumes of information within their day to day operations while increasingly having access to externally created information as well.

Data science applied to accounting data can help organizations understand the implications for decision-making and provide better insights. You might delve into company sales data, purchasing data, contracts, or company disclosures to help solve a variety of business problems.

In the data science domain area of accounting analytics, you will learn to search for relationships between different variables and outcomes they influence, driving business decisions and informing success.

Code	Title	Credits
Core Courses:		
BA 101Z	Introduction to Business	4
BA 215	Accounting: Language of Business Decisions	4
or BA 211Z	Principles of Financial Accounting	
EC 201Z	Principles of Microeconomics	4
Required		
BA 169Z	Data Analysis Using Microsoft Excel	4
ACTG 350	Intermediate Accounting I	4
Take two out the following three		**8**
ACTG 410	Experimental Course: [Topic] (Accounting Data and Analytics Capstone)	
ACTG 480	Accounting Data Analytics I	
OBA 455	Data Driven Predictive Modeling	
Total Credits		**28**

Data Science Domain - Biology

Recent technological breakthroughs in DNA sequencing mean that scientists can characterize an organism's entire genome in a matter of days. But a great challenge remains in translating that genomic sequence — nature's data set — into biology.

That translation is fundamentally changing how we study biology.

In the data science domain area of biology, you will find yourself on the cutting edge of the field, working in the acquisition, analysis, and interpretation of data and how it applies to gene function, disease, microbial ecology, and the assembly and characterization of new genomes.

Code	Title	Credits
Core Courses:		
BI 221Z	Principles of Biology I: Cells	5
BI 222Z	Principles of Biology II: Organisms	5
BI 223Z	Principles of Biology III: Ecology and Evolution	5
or BI 214	General Biology IV: Biochemistry and Genetics	
Electives - Select four of the following:		16
BI 320	Molecular Genetics	
BI 360	Neurobiology	
BI 370	Ecology	
BI 430	Analysis of Neural Data	
BI 471	Population Ecology	
BI/MATH 497M	Deterministic Dynamical Modeling in Biology	
DSCI 411	Capstone Project	
Total Credits		**31**

Data Science Domain - Cultural Analytics

Code	Title	Credits
Core Courses - choose 3		**12**
COLT 301	Approaches to Comparative Literature	
COLT 305	Cultural Studies	
HUM 300	Themes in the Humanities	
ENG 303	Foundations of the English Major: Text	
ENVS 203	Introduction to Environmental Studies: Humanities	
FLR 250	Introduction to Folklore	
Upper division - required		**4**
DSCI 350M	Humanities Research Data Management	
or LIB 350M	Humanities Research Data Management	
Electives - choose 3		**12**
ENG 250	Literature and Digital Culture	
ENG 470	Technologies and Texts Capstone	
ENG/CINE 486M	New Media and Digital Culture: [Topic]	
FLR 495	Folklore Fieldwork	
J 429		
PHIL 123	Internet, Society, and Philosophy	
PHIL 423	Technology Ethics: [Topic]	
Total credits		**28**

Data Science Domain - Earth Sciences

Code	Title	Credits
Core Courses:		
ERTH 202	Earth's Surface and Environment	4
PHYS 201	General Physics	4
or PHYS 251	Foundations of Physics I	
ERTH 315	Earth Physics	4
Choose four of the following:		15-16
ERTH 353	Geologic Hazards	
ERTH 441	Hillslope Geomorphology	
ERTH 453	Tectonics	
ERTH 454	Fluid Dynamics	
ERTH 455	Mechanical Earth	
ERTH 456	Signal Processing	
ERTH 467		
Total Credits		**27-28**

Data Science Domain - Economics

Code	Title	Credits
Core Courses:		
EC 201Z	Principles of Microeconomics	4
EC 311	Intermediate Microeconomic Theory	4
EC 320	Introduction to Econometrics I	4
EC 421	Introduction to Econometrics II	4
Choose three from the following:		12
EC 422	Economic Forecasting	
EC 428	Behavioral and Experimental Economics	
EC 434	Environmental Economics	
EC 443	Health Economics	
EC 451	Issues in Labor Economics	
EC 460	Theories of Industrial Organization	
EC 482	Economics of Globalization	
EC 490	Economic Growth and Development	
Total Credits		**28**

Data Science Domain - Geography

Spatial data is integrated into our everyday lives and employed in a range of professions. We are all integrated into a complex web of movement, place, and discovery, whether we're navigating across town or interpreting maps of election results.

UO geographers use spatial data technologies to focus on remote sensing of the changing environment, climate-change analysis, web-mapping, cartography and data visualization, spatial cognition, and spatial patterns in public health.

In the data science domain area of geography, you will be studying how spatial data can revolutionize business, nonprofit, and government worlds.

Code	Title	Credits
Core Courses:		
GEOG 181	Our Digital Earth	4
GEOG 481	GIScience I	4
GEOG 482	GIScience II	4
Select four of the following		16
GEOG 485	Remote Sensing I	
GEOG 486	Remote Sensing II	
GEOG 490	GIScience: [Topic]	
GEOG 491	Advanced Geographic Information Systems	
GEOG 492	Web Mapping	
GEOG 493	Advanced Cartography and Geo-Visualization	
GEOG 495	Geographic Data Analysis	
DSCI 411	Capstone Project	
Total Credits		**28**

Data Science Domain - Linguistics

Usage-based linguistics studies language as a dynamic, constantly changing system. Much of this work involves working with large collections of text or speech – referred to as "corpora." Examples of readily available real-world corpora include Amazon product reviews and collections of Twitter messages.

Linguists use corpora to help identify patterns and structures in language, providing insights into how we both acquire and lose language skills, how language use varies across people and contexts, and how real-life speech and language evolve.

In the data science domain area of linguistics, you will learn methods to identify linguistic structures within corpora, gleaning new insights while using the best and latest practices in the field. These methods will allow you to answer basic science questions as well as questions that are of interest to marketing firms, political consulting groups, or other commercial enterprises. So, for example, you can use the knowledge you acquire in the linguistics domain to explore how the use of a word like "cool" has changed over time (a basic science question) or to identify linguistic strategies associated with leading positive product reviews for different product types (a marketing question).

Code	Title	Credits
Core Courses:		
LING 301	Introduction to Linguistics Analysis	4
Select two of the following:		8
LING 302	Introduction to Linguistic Behavior	
LING 311	Phonetics and Phonology	
LING 312	Morphosyntax	
Electives - Select four of the following:		16
LING 411	Phonetics	
LING 415	Semantics	
LING 430	Research Methods for Applied Linguistics	
LING 431	Statistical Methods in Linguistics	
LING 435	Advanced Morphology	
LING 451	Advanced Syntax	
LING 493	Corpus Linguistics	

Data Science Capstone Course	
Total Credits	**28**

Data Science Domain - Marketing Analytics

Marketing analytics is the practice of measuring, managing, and analyzing marketing performance to maximize effectiveness and optimize return on investment. Data science applied to marketing data can help a business predict consumer behavior, improve decision-making, and gauge the success of marketing investments.

For example, machine learning and statistical techniques can be used to classify data and detect patterns that might predict a campaign's success.

In the data science domain area of marketing analytics, you will learn how to see the future, through the lens of both existing and new methods of predictive analytics.

Code	Title	Credits
Core Courses:		
BA 101Z	Introduction to Business	4
BA 215	Accounting: Language of Business Decisions	4
EC 201Z	Principles of Microeconomics	4
Required		
BA 169Z	Data Analysis Using Microsoft Excel	4
BA 317	Marketing: Creating Value for Customers	4
or MKTG 311	Marketing Management	
MKTG 390	Marketing Research	4
Pick one of the following:		4
MKTG 415	Marketing Analytics	
OBA 455	Data Driven Predictive Modeling	
OBA 465	Sports Analytics	
Total Credits		**28**

Data Science Domain - Music Technology

Code	Title	Credits
Core Courses		
MUS 227	Elements of Electronic Music	4
MUS 447	Digital Audio and Sound Design (Core)	4
MUS 470	History of Electroacoustic Music	3
Upper division - required		
MUS 448	Interactive Media Performance	3
MUS 479	Data Sonification	4
Upper division - choose 2		6-8
MUS 360	Hip-Hop History, Culture, Aesthetics (Elective)	
MUS 445	Electronic Composition	
MUS 476	Digital Audio Workstation Techniques I	
MUS 483	Audio Effects Theory and Design	
Total Credits		**24-26**

Data Science Domain - Physics

Code	Title	Credits
Core Courses:		
PHYS 251	Foundations of Physics I	4
PHYS 253	Foundations of Physics I	4
PHYS 290	Foundations of Physics Laboratory	1
PHYS 391	Physics Experimentation Data Analysis Laboratory	4
Choose three of the following:		10-12
PHYS 432	Digital Electronics	
PHYS 481	Design of Experiments	
PHYS 491	Research Project I	
Total Credits		**23-25**

Data Science Domain - Sociology

Code	Title	Credits
Core Courses:		
SOC 204Z	Introduction to Sociology	4
or SOC 207	Social Inequality	
SOC 310	Social Theory	4
SOC 311	Research Methods	4
SOC 412	Sociological Research Methods	4
SOC 413	Sociological Research Methods	4
Choose two from the following:		8
SOC 370	Urban Sociology	
SOC 380	Deviance, Social Control, and Crime	
SOC 416	Issues in Environmental Sociology: [Topic]	
SOC 442	Issues in Urban Sociology: [Topic]	
SOC 445	Sociology of Race and Ethnicity: [Topic]	
SOC 451	Social Stratification	
SOC 465	Political Sociology	
SOC 467	Economic Sociology	
Total Credits		**28**

Four-Year Degree Plan

The degree plan shown is only a sample of how students may complete their degrees in four years. There are alternative ways. Students should consult their advisor to determine the best path for them.

Course	Title	Credits	Milestones
First Year			
Fall			
MATH 112Z	Precalculus II: Trigonometry	4	
CS 122	Introduction to Programming and Problem Solving	4	
WR 121Z	Composition I	4	
Core-education course in social science		4	
	Credits	**16**	
Winter			
CS 210	Computer Science I	4	
DSCI 101	Foundations of Data Science I	4	

WR 122Z	Composition II	4
Core-education course in arts and letters		4
	Credits	**16**
Spring		
CS 211	Computer Science II	4
DSCI 102	Foundations of Data Science II	4
MATH 251Z	Differential Calculus	4
Core-education course in social science		4
	Credits	**16**
Second Year		
Fall		
MATH 252Z	Integral Calculus	4
CS 212	Computer Science III	4
Domain course		4
Core-education course in arts and letters		4
	Credits	**16**
Winter		
MATH 341	Elementary Linear Algebra	4
Domain course		4
Core-education course in arts and letters		4
Core-education course in social science		4
	Credits	**16**
Spring		
MATH 342	Elementary Linear Algebra	4
Domain course		4
Cultural literacy course		4
Core-education course in arts and letters		4
	Credits	**16**
Third Year		
Fall		
DSCI 311	Principles and Techniques of Data Science	4
DSCI 345M	Probability and Statistics for Data Science	4
Cultural literacy course		4
Core-education course in social science		4
	Credits	**16**
Winter		
DSCI 372M or CS 372M	Machine Learning for Data Science or Machine Learning for Data Science	4
PHIL 423	Technology Ethics: [Topic]	4
Electives		8
	Credits	**16**
Spring		
Computational and inferential depth course		4
Electives		12
	Credits	**16**
Fourth Year		
Fall		
Domain course		4
Computational and inferential depth course		4
Electives		8
	Credits	**16**
Winter		
Domain course		4
Computational and inferential depth course		4
Electives		8
	Credits	**16**
Spring		
Domain course		4
DSCI 411	Capstone Project (or one additional domain specialization course)	4
Electives		8
	Credits	**16**
	Total Credits	**192**