

DATA SCIENCE B.S.

All students must meet the University Requirements. (<http://catalogue.uvm.edu/undergraduate/academicinfo/degreerequirements>)

DATA SCIENCE MAJOR

The study and applications of Data Science impacts our lives in myriad ways every moment of every day. Often times we are unaware of the role this important field plays in our daily routines. We have data scientists to thank as we read the latest news on our social media feed of choice, or watch a movie suggested by our go-to streaming app. Even the food we eat has likely been guided by the study of big data. Researchers are working hand-in-hand with farms of all sizes to help analyze data which in turn can identify and reduce areas of inefficiency and waste, and bring food to your table in a faster, safer, and more cost-effective way.

The curriculum of the Bachelor of Science with a major in Data Science combines courses from the disciplines of Statistics, Mathematics, and Computer Science to prepare students for careers in Big Data Science & Analytics: rapidly growing fields with huge unmet demand. The unique interdisciplinary educational experience allows students the opportunity to acquire the broad base of knowledge and skills that employers are seeking.

REGULATIONS

Students pursuing the Bachelor of Science degree with a major in Data Science are subject to the Academic Standards in CEMS outlined in this catalogue.

PLAN OF STUDY

THE CURRICULUM FOR THE B.S. IN DATA SCIENCE

CS 064	Discrete Structures	3
or MATH 052	Fundamentals of Mathematics	
STAT 151	Applied Probability	3
or STAT 251	Probability Theory	
or CS 128	Probability Models & Inference	
CS Core (22 credits):		
CS 008	Intro to Web Site Development	3
CS 021	Computer Programming I	3
CS 110	Intermediate Programming	4
CS 124	Data Structures & Algorithms	3
CS 204	Database Systems	3
CS 224	Algorithm Design & Analysis	3
100-Level (or above) CS Elective ¹		3

STAT Core (21 credits):		
STAT 087	Introduction to Data Science	3
STAT 141	Basic Statistical Methods	3
or STAT 143	Statistics for Engineering	
or STAT 211	Statistical Methods I	
STAT 221	Statistical Methods II	3
STAT 201	Stat Computing & Data Analysis	3
STAT 223	Applied Multivariate Analysis	3
STAT 229	Survival/Logistic Regression	3
STAT 287	Data Science I	3
MATH Core (20 credits):		
MATH 021	Calculus I	4
MATH 022	Calculus II	4
MATH 122	Applied Linear Algebra	3
or MATH 124	Linear Algebra	
Choose 3 MATH Electives at the 100-Level or above ¹		9
Choose 12 Credits in Data Science (DS) electives selected from the list of approved courses (see below) in MATH/STAT/CS/CSYS/NR, with at least 9 of these credits at the 200-level (or above): ²		12
CS 120	Advanced Programming	
CS 148	Database Design for the Web	
CS 205	Software Engineering	
CS 224	Algorithm Design & Analysis	
CS 228	Human-Computer Interaction	
CS/MMG 231	Programming for Bioinformatics	
CS 251	Artificial Intelligence	
CS 254	Machine Learning	
CS/CSYS/STAT 256	Neural Computation	
CS/CSYS 302	Modeling Complex Systems ³	
CS 332	Data Mining ³	
CS/CSYS 352	Evolutionary Computation ³	
MATH 121	Calculus III	
MATH 173	Basic Combinatorial Theory	
MATH 235	Mathematical Models & Analysis	
MATH 237	Intro to Numerical Analysis	

MATH 266	Chaos,Fractals&Dynamical Syst	
MATH 268	Mathematical Biology&Ecology	
MATH/CSYS 300	Principles of Complex Systems ³	
MATH/CSYS 303	Complex Networks ³	
STAT 183	Statistics for Business	
STAT 224	Stats for Quality&Productivity	
STAT 225	Applied Regression Analysis	
STAT 231	Experimental Design	
STAT 233	Survey Sampling	
STAT 235	Categorical Data Analysis	
STAT 241	Statistical Inference	
STAT 330	Bayesian Statistics ³	
STAT 387	Data Science II ³	
NR 143	Intro to Geog Info Systems	
CE/CSYS 359	Appld Artificial Neural Ntwrks ³	
CE/CSYS/ STAT 369	Applied Geostatistics ³	
Choose one 2-course Natural Science (w/ lab) sequence:		8
BIOL 001 & BIOL 002	Principles of Biology and Principles of Biology	
CHEM 031 & CHEM 032	General Chemistry 1 and General Chemistry 2	
PHYS 051 & PHYS 152	Fundamentals of Physics I and Fundamentals of Physics II	
University Requirements (12 credits): ⁴		
Foundational Writing & Information Literacy		3
Diversity Category 1		3
Diversity Category 1 or 2		3
Sustainability		3
Free electives ⁵		19

⁴ See University Requirements section of this catalogue for additional information.

⁵ Students are encouraged to use free elective credits to complete a minor in an area of application (e.g., biology, social sciences).

GRADUATE

Complex Systems and Data Science AMP

Complex Systems and Data Science M.S.

See the online Graduate Catalogue for more information

¹ Students should select appropriate courses from list of approved Data Science (DS) electives. Alternative courses may be approved by the DS Curriculum Committee.

² Additional courses, including special topics courses, may be granted approval if appropriate (consult advisor).

³ Undergraduate students require instructor permission to enroll in 300-level courses.