BS in Data Science

Degree Program Description

The BS in Data Science is offered in three focus areas through two colleges. Students electing the computer science focus earn their degree from the College of Engineering. Students electing either the mathematics focus or the statistics focus earn their degree from the College of Arts and Science. The choice of a focus area allows students to take specialized coursework in whichever of the three areas they have the most interest. The degree, BS in Data Science, is the same for all three focuses.

The BS in Data Science is an interdisciplinary degree built on a core triad of fields: statistics, mathematics, and computer science. Students in this program will learn how to acquire, analyze, communicate, and develop models from data through application of statistical, mathematical, and computer science skills. They will also learn data ethics and governance, including legitimate use and algorithmic fairness, as well as privacy, security, and stewardship. In their final year, students will demonstrate their ability to apply knowledge and skills and integrate them into a major data science project. The program allows students to complete their major and general education requirements with room for additional minors or certificates to further prepare them for careers or advanced study. With careful planning, students are also able to complete a second major in the affiliated triad disciplines (CS, Math, Statistics) or in Information Technology. Students who complete the BS in Data Science are prepared for careers in virtually every sector of industry, government, and academia, as well as advanced degrees.

Major Program Requirements

The BS in Data Science requires a total of 120 credit hours for completion. Within the major proper, all students must complete a total of 60 hours, consisting of the following four parts: 1) a core curriculum of 10 required courses (30 credits); 2) four intermediate-level core courses (12 credits) from a restricted list of six; 3) four advanced courses (12 credits) within the chosen focus area of Computer Science, Mathematics, or Statistics; and 4) 6 credits of experiential coursework consisting of case studies, internships, research, and/or thesis, 3 credits of which meet the MU capstone requirement. Students may meet the 6-credit requirement through a combination of such experiential coursework.

Students who complete the degree with the Computer Science focus will receive their degree from the College of Engineering; those who complete in Mathematics or Statistics will receive their degree from the College of Arts and Science.

Students earning a Bachelor of Science in Data Science are required to complete University (http://catalog.missouri.edu/academicdegreerequirements/universityrequirements/), general education (http://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/), and College of Arts and Science (http://catalog.missouri.edu/collegeofartsandscience/#undergraduatetext) requirements, students must also meet the following major program requirements. All major requirements in the College of Arts and Science must be completed with grades of C- or higher unless otherwise indicated. Selected foundational courses, which may fulfill some University general education requirements.

Core Courses		
DATA_SCI 1030	Foundations of Data Science	3
STAT 2800	Intuition, Simulation, and Data	3
CMP_SC 1300	Computing with Data in Python	3
CMP_SC 2300	Introduction to Computational Data Visualization	3
CMP_SC 3380	Database Applications and Information Systems	3
STAT 4510	Applied Statistical Models I	3
STAT 4520	Applied Statistical Models II	3
MATH 1400	Calculus for Social and Life Sciences I	3
or MATH 1500	Analytic Geometry and Calculus I	
MATH 2320	Discrete Mathematical Structures	3
MATH 4140	Matrix Theory	3
Total Credits		**30**
Intermediate Courses		
Students must select 12 credits from the following list.		
CMP_SC 4350	Big Data Analytics	3
CMP_SC 4720	Introduction to Machine Learning and Pattern Recognition	3
STAT 4560	Applied Multivariate Data Analysis	3
STAT 4640	Introduction to Bayesian Data Analysis	3
MATH 2100	Calculus for Social and Life Sciences II	3
or MATH 1700	Calculus II	
MATH 4500	Applied Analysis	3
Advanced Focus Courses		
Students must select 12 credits from within one of the focus areas in the following list.		
Computer Science Focus		
CMP_SC 4540	Neural Models and Machine Learning	3
CMP_SC 4740	Interdisciplinary Introduction to NLP	3
CMP_SC 4750	Artificial Intelligence I	3
CMP_SC 4770	Introduction to Computational Intelligence	3
Statistics Focus		
STAT 4150	Applied Categorical Data Analysis	3
STAT 4310	Sampling Techniques	3
STAT 4330	Methods in Sports Analytics I	3
STAT 4340	Methods in Sports Analytics II	3
STAT 4410	Biostatistics and Clinical Trials	3
STAT 4420	Applied Survival Analysis	3
STAT 4430	Applied Longitudinal Data Analysis	3
STAT 4450	Applied Statistical Methods for Bioinformatics	3
STAT 4540	Experimental Design	3
STAT 4610	Applied Spatial Statistics	3
STAT 4710	Introduction to Mathematical Statistics	3
Mathematics Focus		
MATH 4100	Differential Equations	3
MATH 4310	Numerical Linear Algebra	3
MATH 4355	Quantitative Finance and Insurance I	3

MATH 4540	Mathematical Modeling I	3
MATH 4590	Quantitative Finance and Insurance II	3

Experiential Courses

Students must select 6 credits from the following list.		
CMP_SC 4990	Undergraduate Research in Computer Science	0-6
CMP_SC 4995	Undergraduate Research in Computer Science - Honors	1-6
MATH 4960	Special Readings in Mathematics	1-3
MATH 4996	Honors in Mathematics	2
STAT 4999	Departmental Honors in Statistics	1-3
STAT 4085	Problems in Statistics for Undergraduates	1-3
INTDSC 4971	Capstone Internship in Interdisciplinary Studies	1-6

Semester Plans

Sample Plan of Study - Computer Science focus:

First Year			
Fall	**CR**	**Spring**	**CR**
DATA_SCI 1030	3	CMP_SC 1050	4
CMP_SC 1300	3	MATH 1700	5
MATH 1500	5	STAT 2800	3
ENGLSH 1000	3	Elective (Humanities and/or Fine Arts)	3
	14		**15**
Second Year			
Fall	**CR**	**Spring**	**CR**
CMP_SC 2050	4	CMP_SC 3050	3
MATH 2300	3	CMP_SC 3330	3
MATH 2320	3	CMP_SC 3380	3
CMP_SC 2300	3	STAT 4710	3
Elective (Humanities and/or Fine Arts)	3	Soc/Beh Science Elective	3
	16		**15**
Third Year			
Fall	**CR**	**Spring**	**CR**
STAT 4510	3	MATH 4140	3
CMP_SC 4350	3	STAT 4640	3
Constitutional Elec Soc/Beh Science	3	STAT 4520	3
Biological or Physical Science with Lab	3	Elective (Humanities and/or Fine Arts)	3
Elective Courses	3	Elective Courses	3
	15		**15**
Fourth Year			
Fall	**CR**	**Spring**	**CR**
CMP_SC 4540	3	CMP_SC 4750	3
CMP_SC 4740	3	CMP_SC 4770	3
CMP_SC 4720	3	CMP_SC 4990 (as Writing Intensive)	3
CMP_SC 4990	3	Elective Courses	3
Soc/Beh Science Elective	3	Elective Courses	3
	15		**15**

Total Credits: 120

Sample Plan of Study - Mathematics focus:

First Year			
Fall	**CR**	**Spring**	**CR**
CMP_SC 1300	3	CMP_SC 2300	3
DATA_SCI 1030	3	MATH 1700	5
ENGLSH 1000	3	STAT 2800	3
MATH 1500	5	Elective (Humanities and/or Fine Arts)	3
Elective (Am. Hist / Govt.)	3		
	17		**14**
Second Year			
Fall	**CR**	**Spring**	**CR**
MATH 2300	3	CMP_SC 3380	3
MATH 2320	3	MATH 4100	3
STAT 4510	3	MATH 4140	3
Elective (Social Science)	3	Elective (bio / physical science lab)	4
Elective (first WI)	3	Elective	2
	15		**15**
Third Year			
Fall	**CR**	**Spring**	**CR**
MATH 4355	3	MATH 4540	3
MATH 4500	3	STAT 4560	3
STAT 4520	3	STAT 4640	3
Elective (behavioral science)	3	Elective (Bio / physical / math science)	3
Elective Course (social science)	3	Elective (Humanities and/or Fine Arts)	3
	15		**15**
Fourth Year			
Fall	**CR**	**Spring**	**CR**
MATH 4960 or 4996	3	INTDSC 4971	3
Elective (2nd WI 3000+ level)	3	MATH 4590	3
Elective (behavioral science)	3	Elective (social science)	3
Elective (bio / physical / math science)	3	Electives	5
Elective (humanities / fine arts)	3		
	15		**14**

Total Credits: 120

Sample Plan of Study - Statistics focus:

First Year			
Fall	**CR**	**Spring**	**CR**
CMP_SC 1300	3	CMP_SC 2300	3
DATA_SCI 1030	3	MATH 1700	5
ENGLSH 1000	3	STAT 2800	3
MATH 1500	5	Elective (Humanities and/or Fine Arts)	3
Elective (Am. Hist / Govt.)	3		
	17		**14**

Second Year				
Fall	**CR**	**Spring**	**CR**	
MATH 2300	3	CMP_SC 3380	3	
STAT 4150	3	MATH 2320	3	
STAT 4510	3	STAT 4710	3	
Elective (Social Science)	3	Elective (bio / physical science lab)	4	
Elective (first WI)	3	Elective	2	
	15		**15**	
Third Year				
Fall	**CR**	**Spring**	**CR**	
MATH 4140	3	CMP_SC 4720	3	
STAT 4410	3	STAT 4540	3	
STAT 4520	3	STAT 4560	3	
Elective (behavioral science)	3	Elective (Bio / physical / math science)	3	
Elective Course (social science)	3	Elective (Humanities and/or Fine Arts)	3	
	15		**15**	
Fourth Year				
Fall	**CR**	**Spring**	**CR**	
STAT 4085 or 4999	3	INTDSC 4971 or STAT 4940	3	
Elective (2nd WI 3000+ level)	3	STAT 4640	3	
Elective (behavioral science)	3	Elective (social science)	3	
Elective (bio / physical / math science)	3	Electives	5	
Elective (humanities / fine arts)	3			
	15		**14**	

Total Credits: 120

Degree Audit

The degree audit is an automated report reflecting a student's academic progress toward the completion of a degree.

MU students can request a degree audit by logging in to myDegreePlanner (https://mydegreeplanner.missouri.edu). Students may also access myDegreePlanner via myZou, in the Student Center, click on the Academic Progress Tile, then select Request Degree Audit. The audit automatically pulls in the student's MU course work, transfer courses and courses in progress. This is available to current students, admitted students, and those who last attended less than three terms ago.

Past MU students can request a degree audit by contacting the Academic Advising Unit of the division in which they were last enrolled at MU. For contact information, go to https://advising.missouri.edu/contact/.

Prospective students, can access a preliminary MU degree audit via https://www.transferology.com (https://www.transferology.com/). Information on the college credits already earned will have to be manually entered before it can be evaluated against current degree requirements.

For additional details on degree audits, go to https://registrar.missouri.edu/degrees-audits/degree-audits/.

Major and Career Exploration

The University of Missouri has many resources to assist you in exploring majors and career possibilities. For guidance, visit the Majors and Careers (https://career.missouri.edu/majors-careers/) website or view specific resources below.

- If you are considering a change of major or are exploring multiple majors, schedule an appointment with an advisor in the Discovery Center (https://discoverycenter.missouri.edu/) by calling (573)884-9700 or through MU Connect (https://mizzou.starfishsolutions.com/starfish-ops/dl/instructor/serviceCatalog.html?bookmark=service/3761489) Discovery Center service in you success network.
- If you have decided on a major, visit an academic advisor in the School or College that you are interested in to discuss the process of declaring the major (https://advising.missouri.edu/majors-minors/changing-major/).
- If you would like to learn more about your career interests, abilities, values and talents, visit the MU Career Center (https://career.missouri.edu/connect/). No Appointment is necessary to explore career options with one of our staff members.
- If you would like information about MU majors and degree programs, visit:
  - the Degrees, Majors (Degree Programs), Emphasis Areas, Minors and Certificates (http://catalog.missouri.edu/degreesanddegreeprograms/) page in the catalog,
  - the MU Majors (https://majors.missouri.edu) website.

For additional major and career exploration resources, visit Major & Career Exploration (http://catalog.missouri.edu/majorcareerexploration/) in the catalog.