

DATA SCIENCE

Data Science is a field of study that combines computer science (programming, databases, and algorithms) and statistical methodology, both with a strong mathematical foundation, to apply to diverse areas in ethical ways. Data scientists work in many areas, including business, economics, medicine, epidemiology, agriculture, environmental sciences, sports, and all aspects of government. With the increasing digitization and networking of society, data have become ever more ubiquitous, further expanding the demand for data scientists and their expertise in the collection, management, and analysis of data.

About this Program

- **College:** Liberal Arts and Sciences (<http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/>)
- **Degrees:** Bachelor of Science
- **Credits for Degree:** 120
- **Contact:** Email (dathien@stat.ufl.edu)
- **More Info**

To graduate with this major, students must complete all university, college, and major requirements.

Department Information

The mission of the Department of Statistics is to provide its students with a fundamental understanding of statistical reasoning and methodology, to train them to apply this knowledge to the collection and analysis of data, and to prepare them for careers in a highly technological society in which science and decision-making are increasingly driven by a rapid expansion in the quantity and availability of data.

Website (<https://stat.ufl.edu/>)

CONTACT

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Map (<http://campusmap.ufl.edu/#/index/0010>)

Curriculum

- Actuarial Science Minor
- Combination Degrees
- Data Analytics Certificate
- Data Science
- Statistics
- Statistics Minor

Data Science majors draw inference from large data generated from a variety of disciplines. Core courses cover mathematical foundations of data science, programming, algorithms, and databases as well as statistical methods for data science. Majors will also learn about data science in practice within subject matter areas.

Students who wish to major in data science must consult a department advisor early in their programs.

Coursework for the Major

To take STA 3100, which is required for the major, students must meet the following pre-requisite: STA 2023 (grade of B or higher) OR STA 3032 (grade of B- or higher) OR AP Statistics, (score of 4 or higher out of 5). Students also must receive minimum grades of C within two attempts (including withdrawals) in every required core course and in every course counted toward the 9 credit elective requirement, with the exception of MAC 2312 and MAC 2313 where students must receive a minimum grade of B-. Students cannot retake core or statistics elective courses after earning a minimum grade of C, with the exception of MAC 2312 and MAC 2313, in which students must receive a minimum grade of B-. The grades from all attempts to satisfy core requirements will be used to compute the minimum GPA. A minimum of 18 credits of major coursework must be taken at UF, including a minimum of 12 credits of core coursework.

Required Coursework

The B.S. in data science requires a minimum of 62 credits in data science and related coursework. It is important that the prerequisites of each class are met before the class is attempted.

Code	Title	Credits
Mathematics		17
MAC 2312	Analytic Geometry and Calculus 2	
MAC 2313	Analytic Geometry and Calculus 3	
MAD 2502	Intro to Computational Math	
MAS 3114	Computational Linear Algebra	
MAS 4115	Linear Algebra for Data Science	
Statistics		18
STA 3100	Programming With Data in R	
STA 4321	Introduction to Probability	
STA 4322	Introduction to Statistics Theory	
STA 4210	Regression Analysis	
STA 4241	Statistical Learning in R	
STA 4273	Statistical Computing in R	
Computer Science		17
COP 3502C	Programming Fundamentals 1 (MAC 2311 coreq)	
COP 3503C	Programming Fundamentals 2	
MAD 3107 or COT 3100	Discrete Mathematics Applications of Discrete Structures	
COP 3530	Data Structures and Algorithm	
CIS 4301	Information and Database Systems 1	
Ethics		3
PHI 3681	Ethics, Data, and Technology	
Subject Area Electives		9
Select 3 from Humanities or Natural Sciences or Social Sciences		
<i>Humanities</i>		
REL 2104	Environmental Ethics	
REL 3082	Global Ethics	
REL 3160	Religion and Science	
CLA 3700	Classical Archaeology	
WST 3610	Gender, Race and Science	
WST 4704	Discrimination and Health	
WST 3703	History of American Medicine: Race, Class, Gender, and Science	
<i>Natural Sciences</i>		
PCB 4085	Genetical Ethics	
PHZ 3152	Advanced Computational Techniques	
<i>Social Sciences</i>		
ANT 4930	Special Topics in Anthropology	
LIN 4071	Intro to Corpus Linguistics	
LIN 4702C	Methods in Psycholinguistics	
ECO 4422	Econometrics 2	
EXP 4174C	Laboratory in Sensory Processes	
INR 4931	Special Topics in International Relations	
SYD 4020	Population	
SYD 4021	U.S. Population Issues	
GIS 3043	Foundations of Geographic Information Systems	
POS 4931	Special Topics	
PSB 4343C	Laboratory in Cognitive Neuroscience	

Relevant Minors and Certificates

Data Science majors may want to consider a minor in actuarial science, which prepares students for careers as actuaries. Required courses cover the material for the beginning examinations and VEE credits leading to an associateship in the major national actuarial societies.

Critical Tracking

Critical Tracking records each student's progress in courses that are required for progress toward each major. Please note the critical-tracking requirements below on a per-semester basis.

For degree requirements outside of the major, refer to CLAS Degree Requirements: Structure of a CLAS Degree.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (<http://www.flvc.org/cpp/displayRecord.jsp?cip=270501&track=01>) may be used for transfer students.

Semester 1

- Complete MAC 2311

Semester 2

- Complete MAC 2312 and (STA 2023 or STA 3032)

Semester 3

- Complete COP 3502C and MAC 2313 and MAD 2502

Semester 4

- Complete COP 3503C and MAS 3114 and STA 3100

Semester 5

- Complete (MAD 3107 or COT 3100) and STA 4210 and STA 4321

Semester 6

- Complete COP 3530 and MAS 4115 and PHI 3681 and STA 4322

Semesters 7-8

- Complete CIS 4301 and STA 4241 and STA 4273 and one Subject Area elective

Model Semester Plan

Students are expected to complete the writing requirement while in the process of taking the courses below. Students are also expected to complete the general education international (GE-N) and diversity (GE-D) requirements concurrently with another general education requirement (typically, GE-C, H, or S).

The Subject Area electives and Data Ethics course count towards 3000 level or above electives outside of this multidisciplinary major.

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.

Course	Title	Credits
Semester One		
Quest 1 (Gen Ed Humanities)		3
MAC 2311	Analytic Geometry and Calculus 1 (Critical Tracking ; State Core Gen Ed Mathematics)	4
State Core Gen Ed Biological or Physical Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
State Core Gen Ed Composition		3
	Credits	13
Semester Two		
MAC 2312	Analytic Geometry and Calculus 2 (Critical Tracking ; Gen Ed Mathematics)	4
MAD 2502	Intro to Computational Math (Critical Tracking)	3
STA 2023 or STA 3032	Introduction to Statistics 1 (Critical Tracking ; Gen Ed Mathematics) or Engineering Statistics	3
Gen Ed Composition		3
Gen Ed Physical Sciences		3
	Credits	16
Semester Three		
Quest 2 (Gen Ed Biological or Physical Sciences-area not taken in semester one)		3
COP 3502C	Programming Fundamentals 1 (Critical Tracking)	4
MAC 2313	Analytic Geometry and Calculus 3 (Critical Tracking ; Gen Ed Mathematics)	4
State Core Gen Ed Social Science		3
	Credits	14
Semester Four		
COP 3503C	Programming Fundamentals 2 (Critical Tracking)	4
MAS 3114	Computational Linear Algebra (Critical Tracking)	3

STA 3100	Programming With Data in R (Critical Tracking)	3
Gen Ed Social Science		3
Elective (3000-level or above, not in major)		3
Credits		16
Semester Five		
MAD 3107 or COT 3100	Discrete Mathematics (Critical Tracking) or Applications of Discrete Structures	3
STA 4210	Regression Analysis (Critical Tracking ; Gen Ed Mathematics)	3
STA 4321	Introduction to Probability (Critical Tracking ; Gen Ed Mathematics)	3
Foreign language		5
Credits		14
Semester Six		
COP 3530	Data Structures and Algorithm (Critical Tracking)	3
MAS 4115	Linear Algebra for Data Science (Critical Tracking)	3
PHI 3681	Ethics, Data, and Technology (Critical Tracking)	3
STA 4322	Introduction to Statistics Theory (Critical Tracking ; Gen Ed Mathematics)	3
Foreign language		5
Credits		17
Semester Seven		
CIS 4301	Information and Database Systems 1 (Critical Tracking)	3
STA 4241	Statistical Learning in R (Critical Tracking)	3
Subject Area Elective (Critical Tracking ; 3000-level or higher, Gen Ed Humanities)		3
State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
Gen Ed Biological Sciences		3
Science Laboratory (Gen Ed Biological or Physical Sciences)		1
Credits		16
Semester Eight		
STA 4273	Statistical Computing in R (Critical Tracking)	3
Subject Area Electives (Critical Tracking ; 3000-level or higher)		6
Elective (3000-level or above, not in major; Gen Ed Social and Behavioral Science)		3
Elective		2
Credits		14
Total Credits		120

Academic Learning Compact

The Data Science major enables students to achieve proficiency in the fundamentals of programming, databases, and statistical reasoning. Through coursework and projects, students will gain knowledge in problem solving, data science applications and ethics, and statistical inference. Emphasis is on developing the ability to approach real world problems and through the use of computing and statistical methods to draw valid scientific inferences.

Before Graduating Students Must

- Complete an exam on the fundamentals of data science, which will be 5% of their grade in STA 4241.
- Complete a data analysis project, which will be 10% of their grade in STA 4241.
- Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to

Student Learning Outcomes (SLOs)

Content

1. Identify, define, and describe concepts and issues in data science, including those involved in computing and programming, databases, ethics, mathematical foundations, and statistical methods.

Critical Thinking

2. Identify sources of variability and bias in a given set of data and formulate and carefully program an appropriate statistical analysis.

Communication

3. Clearly and effectively present ideas in speech and in writing concerning issues in the proper analysis of data.

Curriculum Map

I = Introduced; R = Reinforced; A = Assessed

Courses	SLO 1	SLO 2	SLO 3
MAS 3114	I		
MAS 4115	R		
STA 3100	I	I	I
STA 4321	I		
STA 4322	I		
STA 4210	R	R	R
STA 4241	A	A	A
STA 4273	R	R	R
COP 3502C	I		
COP 3503C	R		
COP 3530	I		
CIS 4301	R		
PHI 3681	I	R	R

Assessment Types

- Exams
 - Projects
 - Written and oral presentations
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