

Statistics (BS): Data Science Concentration

The Bachelor of Science in Statistics curriculum provides foundational training for careers in statistics and data science, and also prepares students for graduate study in statistics or related fields such as analytics. The Data Science Concentration adds to that strong foundation with courses designed to prepare graduates for careers in the rapidly evolving Data Science sector. While our curriculum is centered on statistics, mathematics, and computer programming, it is also designed to have a flexible interdisciplinary flavor. Each statistics major works with their advisor to formulate an individualized plan for the use of "Advised Electives" that typically leads to a minor or second major in fields including business and finance, agriculture and life sciences, computer science, industrial engineering, or the social sciences.

Plan Requirements

Code	Title	Hours
Orientation		
COS 100	Science of Change (verify requirement)	0
Communication & Advanced Writing		
Select one of the following Communications courses:		3
COM 110	Public Speaking	
COM 112	Interpersonal Communication	
COM 211	Argumentation and Advocacy	
Select one of the following Advanced Writing courses:		3
ENG 331	Communication for Engineering and Technology	
ENG 332	Communication for Business and Management	
ENG 333	Communication for Science and Research	
ENG 101	Academic Writing and Research ¹	4
Mathematics & Sciences		
MA 141	Calculus I ¹	4
MA 241	Calculus II ¹	4
MA 242	Calculus III ¹	4
MA 225	Foundations of Advanced Mathematics ¹	3
MA 305	Introductory Linear Algebra and Matrices ¹	3
or MA 405	Introduction to Linear Algebra	
Students considering graduate school are strongly encouraged to select MA 405		
GEP Natural Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-natural-sciences/)		11
Selected courses must include (i) at least two laboratory classes and (ii) at least three 3- or 4-credit courses.		
Data Science and Statistical Computing		
PHI 227	Data Ethics	3
DSC 202	Introduction to Data Visualization	1
DSC 405	Data Wrangling and Web Scraping	1
ST 114	Statistical Programming ¹	3
ST 307	Introduction to Statistical Programming- SAS ¹	1
ST 308	Introduction to Statistical Programming - R ¹	1
ST 445	Introduction to Statistical Computing and Data Management ¹	3
Introduction to Data Science: Select one of the following ¹		3

MA 326	Mathematical Foundations of Data Science I	
ST 442	Introduction to Data Science	
CSC 442	Introduction to Data Science	
Statistical Data Science Electives. Select two of the following courses: ¹		6
ST 446	Intermediate SAS Programming with Applications	
ST 452	Statistical Learning and Data Analytics	
ST 453	Advanced Computing for Statistical Reasoning	
General Data Science Electives. Select 2 credits of DSC courses at any level. (p. 2) ¹		2
Advanced Data Science Electives. Select 2 credits of DSC courses at the 400 level. (p. 2) ¹		2
Statistics		
ST 311	Introduction to Statistics ¹	3
Students transferring into the Statistics major having already taken BUS 350, ST 350, ST 370, or ST 371 may substitute that course for ST 311.		
ST 312	Introduction to Statistics II ¹	3
Students transferring into the Statistics major having already taken ST 372 may substitute that course for ST 312.		
ST 421	Introduction to Mathematical Statistics I ¹	3
ST 422	Introduction to Mathematical Statistics II ¹	3
ST 430	Introduction to Regression Analysis ¹	3
ST 431	Introduction to Experimental Design ¹	3
ST 432	Introduction to Survey Sampling ¹	3
ST Electives 400 Level (p. 2) ¹		3
Advised Electives		
Advised Electives ^{1,2}		6
A documented plan for the 6 credits of the Advised Electives will be created in conjunction with the student's academic advisor. These courses may or may not be statistics courses. Students are encouraged to use Advised Elective credits to pursue a minor or second major. Note that many courses used as Advised Electives might have prerequisites or other restrictions.		
GEP Courses		
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		6
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		5
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
GEP Foundations of American Democracy (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/) (verify requirement)		
World Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/) (verify requirement)		
Free Electives		

Free Electives (12 Hr S/U Lmt) ²	6
Total Hours	120

¹ A grade of C- or higher is required.

² Students should consult their academic advisors to determine which courses fill this requirement.

* No more than 6 total credits from undergraduate research, independent study, credit by examination, or other similar types of courses may be used to meet program requirements (credit from AP exams or transfer credits is not included under this restriction). If you are unsure if a course falls into this category, please confer with your advisor.

ST Electives 400 Level

Code	Title	Hours
ST 404	Epidemiology and Statistics in Global Public Health	3
ST 405	Applied Nonparametric Statistics	3
ST 412	Long-Term Actuarial Models	3
ST 420	Statistical Principles of Clinical Trials	3
ST 413	Short-Term Actuarial Models	3
ST 421	Introduction to Mathematical Statistics I	3
ST 422	Introduction to Mathematical Statistics II	3
ST 430	Introduction to Regression Analysis	3
ST 431	Introduction to Experimental Design	3
ST 432	Introduction to Survey Sampling	3
ST 433	Applied Spatial Statistics	3
ST 434	Applied Time Series	3
ST 435	Statistical Methods for Quality and Productivity Improvement	3
ST 437	Applied Multivariate and Longitudinal Data Analysis	3
ST 440	Applied Bayesian Analysis	3
ST 442	Introduction to Data Science	3
ST 445	Introduction to Statistical Computing and Data Management	3
ST 446	Intermediate SAS Programming with Applications	3
ST 451	Sports Analytics	3
ST 452	Statistical Learning and Data Analytics	3
ST 453	Advanced Computing for Statistical Reasoning	3
ST 491	Statistics in Practice	3
ST 495	Special Topics in Statistics	1-6
ST 497	Professional Experience in Statistics	1-3
ST 498	Independent Study In Statistics	1-6
ST 499	Research Experience in Statistics	1-3

General Data Science Electives

Code	Title	Hours
DSC 205	Data Communication	1
DSC 225	Data Science for Social Good	1
DSC 235	Introduction to Data Science for Cybersecurity	1
DSC 295	Introductory Special Topics in Data Science	1-3
DSC 406	Exploratory Data Analysis for Big Data	1
DSC 410	Data Internship Preparation for Social Impact	1
DSC 412	Exploring Machine Learning	1

DSC 495	Special Topics in Data Science	1-3
DSC 595	Graduate Special Topics in Data Science	1-3

Advanced Data Science Electives

Code	Title	Hours
DSC 406	Exploratory Data Analysis for Big Data	1
DSC 410	Data Internship Preparation for Social Impact	1
DSC 412	Exploring Machine Learning	1
DSC 495	Special Topics in Data Science	1-3
DSC 595	Graduate Special Topics in Data Science	1-3

First Year

Fall Semester		Hours
COS 100 or E 115	Science of Change or Introduction to Computing Environments	2
ST 311	Introduction to Statistics ¹	3
MA 141	Calculus I (CP) ¹	4
Select one of the following: ¹		3
ST 114	Statistical Programming (CP)	
CSC 111	Introduction to Computing: Python	
CSC 116	Introduction to Computing - Java	
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Hours		13

Spring Semester

Select one of the following:		3
COM 110	Public Speaking	
COM 112	Interpersonal Communication	
COM 211	Argumentation and Advocacy	
MA 241	Calculus II (CP) ¹	4
ENG 101	Academic Writing and Research	4
ST 312	Introduction to Statistics II (CP) ¹	3
ST 307	Introduction to Statistical Programming-SAS (CP) ¹	1
Hours		15

Second Year

Fall Semester

MA 242	Calculus III (CP) ¹	4
MA 225	Foundations of Advanced Mathematics (CP) ¹	3
ST 445	Introduction to Statistical Computing and Data Management ¹	3
PHI 227	Data Ethics ^{Provides 3 credits of Humanities GEP credit}	3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Hours		14

Spring Semester

ST 308	Introduction to Statistical Programming - R ¹	1
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GEP Requirement (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3
ST 431 Introduction to Experimental Design ¹	3
MA 305 or MA 405 Introductory Linear Algebra and Matrices (CP) ¹ or Introduction to Linear Algebra	3
DSC 202 Introduction to Data Visualization ¹	1
DSC 405 Data Wrangling and Web Scraping ¹	1
Free Elective	3
Hours	15

Third Year**Fall Semester**

ST 421 Introduction to Mathematical Statistics I (CP) ¹	3
ST 430 Introduction to Regression Analysis (CP) ¹	3
GEP Requirement (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3
Advised Elective (p. 1) ¹	3
Introduction to Data Science (p. 1) ¹	3
General Data Science Elective (p. 2) ¹	1
Hours	16

Spring Semester

ST 422 Introduction to Mathematical Statistics II (CP)	3
GEP Requirement (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3
GEP Natural Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-natural-sciences/)	4
Statistics Elective (p. 2) ¹	3
Statistical Data Science Elective (p. 1) ¹	3
Hours	16

Fourth Year**Fall Semester**

Select one of the following:	3
ENG 331 Communication for Engineering and Technology	
ENG 332 Communication for Business and Management	
ENG 333 Communication for Science and Research	
GEP Requirement (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3
Advised Elective (p. 1) ¹	3
GEP Natural Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-natural-sciences/)	3
Statistical Data Science Elective (p. 1) ¹	3
General Data Science Electives (p. 2) ¹	1
Hours	16

Spring Semester

ST 432 Introduction to Survey Sampling ¹	3
GEP Natural Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-natural-sciences/)	4
Free Electives	3
Advanced Data Science Electives (p. 2) ¹	2

GEP Requirement (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3
Hours	15
Total Hours	120

¹ At most one D level grade is permitted in Advised Electives, Statistics Electives, or required MAT, ST, or CSC courses. C- or better is required in ST 307 Introduction to Statistical Programming- SAS, ST 311 Introduction to Statistics, ST 312 Introduction to Statistics II and ST 421 Introduction to Mathematical Statistics I.

Career Opportunities

The importance of sound statistical thinking in the design and analysis of quantitative studies is reflected in the abundance of job opportunities for statisticians. Because one can improve the efficiency and use of increasingly complex and expensive experimental and survey data, statisticians are in demand wherever quantitative studies are conducted. Statisticians are highly valued members of teams working in such diverse fields as biomedical science, global public health, weather prediction, environmental monitoring, political polling, crop and livestock management, and financial forecasting. Statistics is at the core of Data Science and Analytics, and our department provides an outstanding environment to prepare for careers in these areas. In addition to finding exciting careers in industry and government, our graduates are also very successful moving on to graduate programs in statistics and related fields at top universities around the globe.

Career Titles

- Actuary
- Aeronautical & Aerospace Engineer
- Aerospace Engineering Technician
- Air Traffic Controller
- Astronomer
- Atmospheric and Space Scientist
- Bank and Branch Managers
- Biopsychologist
- Budget Analyst
- Buyer
- Compensation Administrator
- Computer and Information Scientists
- Computer Programmer
- Database Administrator
- Financial Aid Counselor
- Financial Analyst
- Government Budget Analyst
- High School Teacher
- Market Research Analysts and Marketing Specialists
- Math Professor
- Mathematical Technician
- Mathematician
- Meteorologist
- Middle School Teacher
- Operations Research Analyst
- Physicist
- Psychometrist

- Purchasing Manager
- Securities and Commodities Sales Agent
- Social Science Research Assistants
- Statistical Assistants
- Statistician
- Technical Publications Writer

Learn More About Careers

NCcareers.org (<https://nccareers.org/>)

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)

This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your future career. An NC State email address is required to create an account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.

American Statistical Association (<https://www.amstat.org/>)

American Mathematical Society (<https://www.ams.org/home/page/>)