STATISTICS

Overview

With the digital revolution, the world is becoming increasingly more quantitative, and the field of statistics has become essential in advancing our understanding of the natural, political, and social sciences as well as the fields of medicine and public health. Statistics also constitutes a crucial part of decision making in industry, business, and government, and is at the heart of the emerging field of Data Science.

Students studying statistics at New College will develop statistical reasoning skills and apply them when analyzing and modeling data from many different sources. They will learn both classical and modern statistical techniques as well as the theoretical foundations underlying these methodologies. At the same time, they will acquire the necessary computational skills to work with data and evaluate the role of uncertainty in inferential statistical analyses. Through their experience working on both individual and team projects, students will also learn how to effectively communicate and report statistical results to different audiences.

Faculty in Statistics

Melissa Crow (https://www.ncf.edu/directory/melissa-a-crow/), Instructor of Statistics
Bernhard Klingenberg (https://www.ncf.edu/directory/bernhard-klingenberg/), Professor of Statistics/Interim Director of Data Science
Milo Schield (https://www.ncf.edu/directory/milo-schield/), Visiting Professor of Statistics
Andrey Skripnikov (https://www.ncf.edu/directory/andrey-skripnikov/), Assistant Professor of Applied Statistics

Requirements for the AOC in Statistics

A minimum of eleven (11) academic units.

Code	Title
Mathematics [1]	
MATH 2311	Calculus I*
MATH 2312	Calculus II*
MATH 3105	Linear Algebra
MATH 2500 & MATH 3510	Probability I and Probability II* [2]
Core Requirements	
STAN 2700	Dealing with Data I*
STAN 2800	Dealing with Data II
STAN 3275	Applied Linear Models
Electives [3]	
Select **four** from the following examples:	
STAN 3350	Introduction to Categorical Data Analysis
STAN 3700	R for Data Science
STAN 3000	Statistical Learning
STAN 3780	Applied Time Series Analysis
STAN 3230	Data Visualization and Communication
STAN 4300	Statistical Estimation and Inference
DATA 3110	Data Munging and Exploratory Data Analysis
DATA 4300	Databases for Data Science
Additional Requirement	
Senior Thesis in Statistics and Baccalaureate Exam	

1. It is recommended that students planning an AOC in Statistics complete the calculus and linear algebra courses by the end of their second year.
2. These are each one-mod courses; together they count as one academic unit.
3. This list is not exhaustive. Please consult with the Statistics faculty as other courses may also satisfy this requirement, such as certain undergraduate courses in Mathematics or other fields, undergraduate or graduate Data Science courses, or tutorials supervised by Statistics faculty.

Requirements for the Joint AOC in Statistics

A minimum of eight (8) academic units.

Code	Title
Mathematics	
MATH 2311	Calculus I*
MATH 2500 & MATH 3510	Probability I and Probability II* [1]
Core Requirements	
STAN 2700	Dealing with Data I*
STAN 2800	Dealing with Data II
STAN 3275	Applied Linear Models
Electives [2]	
Select **three** from the following examples:	
STAN 3350	Introduction to Categorical Data Analysis
STAN 3700	R for Data Science
STAN 3000	Statistical Learning
STAN 3780	Applied Time Series Analysis
STAN 3230	Data Visualization and Communication
STAN 4300	Statistical Estimation and Inference
DATA 3110	Data Munging and Exploratory Data Analysis
DATA 4300	Databases for Data Science
Additional Requirement	
Senior Thesis demonstrating knowledge of statistical methods and Baccalaureate Exam	

1. These are each one-mod courses; together they count as one academic unit.
2. This list is not exhaustive. Please consult with the Statistics faculty as other courses may also satisfy this requirement, such as certain undergraduate courses in Mathematics or other fields, undergraduate or graduate Data Science courses, or tutorials supervised by Statistics faculty.

Requirements for a Secondary Field in Statistics

A minimum of six and one-half (6 1/2) academic units.

Code	Title
Mathematics	
MATH 2500	Probability I [1]
Core Requirements	
STAN 2700	Dealing with Data I*
STAN 2800	Dealing with Data II
STAN 3275	Applied Linear Models
Electives [2]	
Select **three** from the following examples:	
STAN 3350	Introduction to Categorical Data Analysis
STAN 3700	R for Data Science
STAN 3000	Statistical Learning
STAN 3780	Applied Time Series Analysis
STAN 3230	Data Visualization and Communication
DATA 3110	Data Munging and Exploratory Data Analysis
DATA 4300	Databases for Data Science

1 This is a one-mod course.

2 This list is not exhaustive. Please consult with the Statistics faculty as other courses may also satisfy this requirement, such as certain undergraduate courses in Mathematics or other fields, undergraduate or graduate Data Science courses, or tutorials supervised by Statistics faculty.

The four-year sample pathway to a Statistics AOC starts with the introductory courses Dealing with Data I & II, which are non-calculus based, and the Calculus I & II sequence, which provides the necessary mathematical background for the study of statistics. In the second year, this is followed by courses in Probability and Linear Algebra, in addition to at least one applied statistics elective. With this background, students are well prepared to take the core course in Linear Models along with many other elective courses starting in their third year.

Sample Four-Year Pathway

First Year		
Fall Term	**ISP**	**Spring Term**
Dealing with Data I	ISP	Dealing with Data II
Calculus I		Calculus II
Second Year		
Fall Term	**ISP**	**Spring Term**
R for Data Science	ISP	Introduction to Categorical Data Analysis
Probability I and II		Linear Algebra
Third Year		
Fall Term	**ISP**	**Spring Term**
Linear Models	ISP	Mathematical Statistics
		Applied Time Series Analysis
Fourth Year		
Fall Term	**ISP**	**Spring Term**
Statistical Learning	Thesis	Thesis
Thesis		

Sample Two-Year Pathway

The two-year pathway requires that a student has completed Calculus I & II and a one-semester introductory statistics course.

First Year		
Fall Term	**ISP**	**Spring Term**
Dealing with Data II	ISP	Introduction to Categorical Data Analysis
R for Data Science		Linear Algebra
Probability I & II		
Second Year		
Fall Term	**ISP**	**Spring Term**
Linear Models	ISP	Mathematical Statistics
Applied Time Series Analysis	Thesis	Statistical Learning
Thesis		Thesis

Representative Senior Theses in Statistics

- Spatial Modeling of the Relative Abundance of Bird Populations in Peninsular Florida Using Citizen Science Data
- Effects of Multicollinearity in Variable Selection Algorithms
- Distance, Movement, and Turnout: The Relationship Between Precinct Polling Locations and Turning Out to Vote
- Statistical Modeling of Solar Flare Occurrences and Their Energy Distributions
- Teaching Statistics through Mobile Applications
- Dynamics of Protein Synthesis with Autoregulation: A Computational Biology Approach