

# BIOMETRY AND STATISTICS MINOR

College of Agriculture and Life Sciences

Program Website (<https://cals.cornell.edu/education/degrees-programs/biometry-statistics-major-and-minor/>)

## Program Description

A minor in Biometry and Statistics is available to all undergraduate students, with the exception of students majoring in Statistics & Biometry. To complete the program, students must submit a minor application form online. Students should contact the Assistant Director of Undergraduate Advising for Statistics and Data Science if they have general questions about Biometry and Statistics courses or the minor.

## Minor Requirements

| Code                                                                                                                              | Title                                                        | Hours |
|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------|
| <b>Calculus I</b> <sup>1</sup>                                                                                                    |                                                              |       |
| MATH 1110                                                                                                                         | Calculus I                                                   | 4     |
| <b>Calculus II</b> <sup>2</sup>                                                                                                   |                                                              |       |
| MATH 1120                                                                                                                         | Calculus II                                                  | 4     |
|                                                                                                                                   | or MATH 1910 Calculus for Engineers                          |       |
| <b>Multivariable Calculus</b> <sup>3</sup>                                                                                        |                                                              |       |
| MATH 2220                                                                                                                         | Multivariable Calculus                                       | 4     |
|                                                                                                                                   | or MATH 2240 Theoretical Linear Algebra and Calculus         |       |
|                                                                                                                                   | or MATH 2130                                                 |       |
|                                                                                                                                   | or MATH 1920 Multivariable Calculus for Engineers            |       |
| <b>Statistical Methods I</b> <sup>4</sup>                                                                                         |                                                              |       |
| BTRY 3010                                                                                                                         | Statistics I (or)                                            |       |
| BTRY 6010                                                                                                                         | Statistical Methods I (or)                                   |       |
| An equivalent course: AEM 2100, ENGRD 2700, HADM 2010, ILRST 2100, MATH 1710, PAM 2100/2101, PSYCH 2500, SOC 3010, or STSCI 2150. |                                                              |       |
| <b>Statistical Methods II</b>                                                                                                     |                                                              |       |
| STSCI 3200                                                                                                                        | Statistics II                                                | 4     |
|                                                                                                                                   | or BTRY 6020 Statistical Methods II                          |       |
| <b>Probability</b>                                                                                                                |                                                              |       |
| Select one of the following:                                                                                                      |                                                              |       |
| STSCI 3080                                                                                                                        | Probability Models and Inference                             |       |
| MATH 4710                                                                                                                         | Basic Probability                                            |       |
| ECON 3130                                                                                                                         | Probability and Statistics                                   |       |
| ORIE 3500                                                                                                                         | Eng Probability and Statistics: Modeling and Data Science II |       |

- <sup>1</sup>
- Students may have this requirement fulfilled by adequate performance in AP Calculus AB. (see Advanced Placement and Non-Cornell (Transfer) (<https://cals.cornell.edu/undergraduate-students/cals-student-services/academic-resources/advanced-placement-and-non-cornell-transfer-credit/>)).
  - Students may have this requirement fulfilled with a passing score ("S") on the CASE Exam (<https://math.cornell.edu/ap/#cornell-placement-exams>) for MATH 1110.

- Students may have this requirement fulfilled if credit is earned for MATH 1110 due to adequate scores on GCE "A" level exams or IB higher-level exams (see Advanced Placement for Calculus (<https://math.cornell.edu/ap/>)).

- <sup>2</sup>
- Students may have this requirement fulfilled by adequate performance in AP Calculus BC (see Advanced Placement and Non-Cornell (Transfer) Credit).

- Students may have this requirement fulfilled with a passing score ("S") on the CASE Exam for MATH 1120 or MATH 1910.

- Students may have this requirement fulfilled if credit is earned for MATH 1120 due to adequate scores on GCE "A" level exam in Singapore (see Advanced Placement for Calculus).

- <sup>3</sup>
- Students may have this requirement fulfilled with a passing score ("S") on the CASE Exam for MATH 1920.

- <sup>4</sup>
- Students may have this requirement fulfilled by adequate performance in AP Statistics.

## Electives

Only courses for which the student receives a grade of C– or better will count toward the minor in Biometry and Statistics.

| Code                                                                                | Title                                                 | Hours |
|-------------------------------------------------------------------------------------|-------------------------------------------------------|-------|
| <b>Students must take three additional courses from the list below</b> <sup>1</sup> |                                                       |       |
| BTRY 3090                                                                           | Financial Math for Actuarial Science                  | 4     |
| BTRY 3100                                                                           | Statistical Sampling                                  | 4     |
| BTRY 4820                                                                           |                                                       |       |
| STSCI 3510                                                                          | Stochastic Processes for Decision-Making              | 4     |
| STSCI 3740                                                                          | Data Mining and Machine Learning                      | 4     |
|                                                                                     | or CS 3780 Introduction to Machine Learning           |       |
|                                                                                     | or CS 4786                                            |       |
|                                                                                     | or ORIE 3741 Learning with Big Messy Data             |       |
| STSCI 3900                                                                          | Causal Inference                                      | 3     |
| STSCI 4010                                                                          |                                                       |       |
| STSCI 4050                                                                          | Modern Regression Models for Data Science             | 4     |
| STSCI 4060                                                                          | Python Programming and its Applications in Statistics | 4     |
| BTRY 4100                                                                           | Multivariate Analysis                                 | 4     |
| BTRY 4110                                                                           | Categorical Data                                      | 3     |
| BTRY 4140                                                                           | Applied Design                                        | 4     |
| BTRY 4270                                                                           | Introduction to Survival Analysis and Loss Models     | 3     |
| STSCI 4550                                                                          | Applied Time Series Analysis                          | 4     |
| STSCI 4630                                                                          | Operations Research Tools for Financial Engineering   | 4     |
| STSCI 4780                                                                          | Bayesian Data Analysis: Principles and Practice       | 4     |
| STSCI 5640                                                                          | Statistics for Financial Engineering                  | 4     |
| BIOCB 4381                                                                          | Biomedical Data Mining and Modeling                   | 3     |
| BIOCB 4830                                                                          | Quantitative Genomics and Genetics                    | 4     |

|            |                                     |   |
|------------|-------------------------------------|---|
| BIOCB 4840 | Computational Genetics and Genomics | 4 |
| CS 4740    | Natural Language Processing         | 4 |
| ECON 4110  |                                     |   |
| NTRES 6700 |                                     |   |

Students can take two of the following courses to count as ONE elective: STSCI 3600 (2 cr), STSCI 4610 (2 cr), and STSCI 4850 (2 cr).

<sup>1</sup> Linear Algebra, STSCI 4030 Linear Models with Matrices, STSCI 4090 Theory of Statistics and STSCI 4520 Statistical Computing can also be counted towards this requirement.

## Learning Outcomes

- Students will be able to explain and apply the fundamentals of applied statistical methodology.
- Students will be able to use modern computational methods.
- Students will be able to demonstrate knowledge of the statistical foundations of data science.