# Statistics Major (B.S. in Statistics) Program

The Department of Mathematical Sciences offers a major leading to the Bachelor of Science (B.S.) in Statistics.

The completion of the major requires

- overall GPA of 2.0 or better;
- GPA of 2.0 or better in all MATH and STAT courses;
- 39 credit hours (grade of C- or better) from the core courses;
- a minimum of 9 credit hours (grade of C- or better) from the elective courses;
- and 6 credit hours (grade of C- or better) from the scientific discipline courses.

**Note: For the official degree audit, please check it with your college advisor.**

## Core courses for B.S. in Statistics (39 credit hours):

| Course Number | Course Title | Pre-requisites | Semester (as of AY23-24) | Credit Hours |
|---|---|---|---|---|
| MATH1061 | Calculus I | See Catalyst | Fall & Spring | 4 |
| MATH1062 | Calculus II | MATH1061 | Fall & Spring | 4 |
| MATH2063 | Multivariate Calculus | MATH1062 | Fall & Spring | 4 |
| MATH2076 | Linear Algebra | MATH1062 | Fall & Spring | 3 |
| STAT2037 | Probability and Statistics I | MATH1045 or MATH1062 | Fall & Spring | 3 |
| STAT3038 | Probability and Statistics II | STAT2037 | Fall & Spring | 3 |
| STAT3041 | Data Science and Statistics | STAT2037 | Fall & Spring | 3 |
| STAT4041 | Bayesian Data Science | STAT3038 and STAT3041 | **Fall** (only) | 3 |
| STAT4121 | Mathematical Statistics I | MATH2063, MATH2076, and STAT2037 | Fall & Spring | 3 |
| STAT4131 | Applied Regression Analysis | MATH2063, MATH2076, and STAT2037 | Fall & Spring | 3 |
| STAT5132 | Design and Analysis of Experiments | STAT4131 | **Spring** (only) | 3 |
| MATH5001 or 5002 | Math Capstone * | Permission of Department | Fall & Spring | 3 |

* Capstone Seminar (MATH5001) or Capstone Project (MATH5002) lets students extend their statistical knowledge beyond their coursework. Students should plan to complete their capstone in their final semester of the program.

- Capstone Project (MATH5002) is for students who have a specific project in mind and a faculty member who has agreed to oversee their project. The student and professor work out the details of the capstone, and the faculty mentor determines a grade.
- Capstone Seminar (MATH5001) is an alternative for students who do not have a specific project or mentor in mind. The Seminar meets through the semester as a typical course does, and students work together through the process of completing their capstones.
- To register for either capstone, contact the Undergraduate Program Director (Statistics) for permission.

## Minimum of 9 credit hours from the following elective courses:

| Course Number | Course Title | Pre-requisites | Semester (as of AY23-24)* | Credit Hours |
|---|---|---|---|---|
| STAT5141 | Time Series | STAT4131 | Spring | 3 |
| STAT5142 | Survival Analysis and Logistic Regression | STAT4131 | Fall | 3 |
| STAT5143 | Applied Bayesian Analysis | STAT4121 | Spring | 3 |
| STAT5144 | Nonparametric Statistics ** | STAT3038 | ** | 3 |
| STAT5145 | Statistical Computing | STAT3038 | Fall | 3 |
| STAT5151 | Statistical Consulting ** | Permission Only | ** | 3 |
| STAT5171 | Statistics and Machine Learning | STAT4121 and STAT4131 | Spring | 3 |
| STAT5122 | Mathematical Statistics II *** | STAT4121 | Spring | 3 |
| MATH3001 | Introduction to Abstract Math | MATH2076 | Fall & Spring | 3 |
| MATH4008 | Introduction to Probability | MATH2063 and STAT2037 | Fall & Spring | 3 |
| MATH4009 | Financial Math for Actuarial Sciences | STAT2037 | Fall & Spring | 3 |
| MATH5106 | Numerical Analysis | MATH2063, MATH2076, and MATH2073 (or MATH2074) | Fall | 3 |
| MATH5108 | Applied Probability and Stochastic Processes | STAT2037 | Fall | 3 |

* The offering semesters are for the academic year (AY) 2023-2024. This may change for the next AY. Please check it with your college advisor and the STAT undergraduate program director.
** STAT5144 and STAT5151are offered irregularly, i.e., not offered every year.
*** Only recommended to students who plan to go statistics graduate school.

## Minimum of 6 credit hours from the following scientific discipline courses:

| Course Number | Course Title | Credit Hours |
|---|---|---|
| BIOL1081 | Biology I: Molecules, Cells, and the Foundation of Life | 3 |

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|---|---|---|
| BIOL1082 | Biology II: Evolution, Physiology, and Ecology | 3 |
| CHEM1040 | General Chemistry I | 4 |
| CHEM1041 | General Chemistry II | 4 |
| CS1021C | Computer Science 1 | 4 |
| CS2028C | Data Structures | 4 |
| ECON2020 | Intermediate Microeconomics | 3 |
| ECON2030 | Intermediate Macroeconomics | 3 |
| GEOG5171C | Introduction to Geographic Information Sciences | 3 |
| GEOG5181C | Intermediate GIS | 3 |
| GEOG6071C | Introduction to Geographic Information Sciences | 3 |
| GEOG6081C | Intermediate GIS | 3 |
| PHYS2005 | College Physics I (Calculus-based course for physics majors) | 4 |
| PHYS2006 | College Physics II (Calculus-based course for physics majors) | 4 |
| PHYS2001 | College Physics I (Calculus-based) (C- min) | 4 |
| PHYS2002 | College Physics II (Calculus-based) (C- min) | 4 |

## Notes

- To determine which courses need to be taken in each year, refer to the "sample" curriculum (major map) available in the department website or the eCurriculum.
- Students should complete MATH1062 and STAT2037 as early as possible. It is required for almost all other courses in the major.
- All pre-requisites must be completed with a grade of C- or better to register for the next courses.
- Departmental Honors require completion of at least five STAT/MATH courses at the 5000-level or above and at least 3.5 GPA in STAT/MATH courses.
- Departmental High Honors require completion of at least six STAT/MATH courses at the 5000-level or above and at least 3.75 GPA in STAT/MATH courses.
- Students pursuing a career in actuarial sciences should take the P and F/M actuarial exams during their time in this program.
- There are several scholarship funds open only to stat or math majors. There is a call for applications every year, usually early spring semester. Please apply!

## Contact

For more information regarding B.S. in Statistics, contact the Undergraduate Program Director - Statistics

- Dr. Hang Kim (hang.kim@uc.edu), 5410 French Hall (West Campus)

Also, contact your college advisor who can officially audit your degree requirement

## Additional Notes for Students Pursuing Actuarial Profession

- The following courses are highly recommended to take:
  MATH2010, Actuarial Science Seminar & MATH4010, Actuary Exam Preparation Seminar
- If you have questions about a career in actuarial sciences and/or taking the P and F/M actuarial exams, contact Dr. Seongho Song (songso@ucmail.uc.edu).