

Statistics

College of Letters and Science (<http://ls.berkeley.edu>)

Department Office: 367 Evans Hall, (510) 642-2781

Chair: Philip Stark, PhD

Department Website: Statistics (<http://www.stat.berkeley.edu>)

Overview

The Department of Statistics grants BA, MA, and PhD degrees in Statistics. The undergraduate and graduate programs allow students to participate in a field that is growing in breadth of application and importance. Understanding the natural and human worlds in the "information age" increasingly requires statistical reasoning and methods, and stochastic models are essential components of research and applications across a vast spectrum of fields. The Department of Statistics provides students with world-class resources for study and research, including access to the extensive computational facilities maintained by the Statistical Computing Facility.

Service Courses

The department offers a variety of introductory service courses differing both in mathematical level and in topics emphasized. Statistics 2 requires only high school mathematics; 20 and 21 require some calculus; 20 is for all students; 21 is intended for business or economics majors, although both majors accept 20 as a prerequisite. Statistics 131A emphasizes methods used in social and life sciences. Statistics 133 is an introduction to software and data structures for organizing, analyzing, and visualizing data. Statistics 134 is a thorough beginning probability course. Statistics 135 covers statistical concepts that are central in engineering and science. Statistics 200A and 200B are graduate-level versions of 134 and 135, respectively.

Major Requirements

Prerequisites

In March 2013, the Statistics Department implemented a change in its prerequisites for the undergraduate major.

New prerequisites apply to all students who **did not** finish the lower division math prerequisites by the end of Spring 2013.

1. Students must earn a minimum 3.2 grade point average (GPA) in and no lower than a C in:

- Math 1A Calculus
- Math 1B Calculus II
- Math 53 Multivariable Calculus
- Math 54 Linear Algebra and Differential Equations

2. Students must also earn a B- in either Stat 134 or Stat 135, with no more than one course repeated between Stat 134 and Stat 135.

Former prerequisites apply to students who finished the following math courses with at least a C or better by the end of Spring 2013.

A letter grade of a C or better must be earned for EACH prerequisite:

- Math 1A Calculus
- Math 1B Calculus II
- Math 53 Multivariable Calculus
- Math 54 Linear Algebra and Differential Equations

These students will be "grandfathered" into the major and are strongly encouraged to submit their applications as soon as possible.

Upper Division

Three core statistics courses:

- Stat 133 Concepts in Computing with Data
- Stat 134 Concepts of Probability (other non-Statistics UC Berkeley courses, such as IEOR 172 cannot be used to fulfill this requirement)
- Stat 135 Concepts of Statistics

Three statistics electives (at least one course must have a lab). Choose from:

- Stat 150 Stochastic Processes
- Stat 151A or 151B (lab) Linear Modelling: Theory and Applications
- Stat 152 (lab) Sampling Surveys
- Stat 153 (lab) Introduction to Time Series
- Stat 154 (lab) Modern Statistical Prediction and Machine Learning
- Stat 155 Game Theory
- Stat 157 Seminar on Topics in Probability and Statistics
- Stat 158 (lab) The Design and Analysis of Experiments

Three applied cluster courses (at least three units).

Three upper division courses will be selected, in conjunction with advice from the undergraduate faculty adviser, from a field in which statistics is applied. Possible fields include CS, Demography, IEOR, Business Administration, Economics, and a combination of Business Administration and Economics. See approved cluster courses (<http://statistics.berkeley.edu/programs/undergrad/approved-cluster-courses>) for a comprehensive list.

Teaching Option

Students interested in teaching statistics and mathematics in middle or high school should take the following courses:

- All lower division courses required for the statistics major
- Statistics 133
- Statistics 134
- Statistics 135
- Two courses from Statistics 150, 151A, 151B, 152, 153, 154, 155, 157, or 158 including at least one course with a laboratory
- Four Math courses: Mathematics 110, Mathematics 113, Mathematics 151, and either Mathematics 152 or Mathematics 153 are required.

If you are interested in teaching, consider the Cal Teach Program (<http://calteach.berkeley.edu>).

Minor Requirements

The minor is for students who want to study a significant amount of Statistics and Probability at the upper division level. It will provide them

with formal recognition for their effort on their transcript, but not on their diploma.

The minor has the same lower division prerequisites as the major (a total of four courses): Mathematics 1A, 1B, 53 and 54.

The required upper division courses (total of five courses) will be: Statistics 150, 151A, 151B, 152, 153, 154, 155, 157, and 158 including at least one course with a laboratory (exactly as in the major)

Minimum overall grade point average of 2.0 required in upper-division courses used for the minor.

Overlap between Major and Minor: Maximum of one upper division course.

How to Obtain the Minor in Statistics

You may obtain the minor once you have completed both the lower division prerequisites and the five upper division requirements. You will need to meet with the undergraduate faculty adviser. Consult the department website (<http://statistics.berkeley.edu/programs/undergrad/minor>) for more information.

The Graduate Program

The department offers the MA and PhD degrees. For detailed information concerning the requirements for these degrees, including admissions, go to the website. (<http://www.stat.berkeley.edu>) The standard PhD program in statistics provides a broad background in probability theory and in applied and theoretical statistics. Additionally, building on the interdisciplinary strengths of the department, there are three specialized "Designated Emphasis" (DE) tracks:

- The DE in computational science and engineering
- The DE in computational and genomic biology
- The DE in communication, computation, and statistics

Working toward a PhD with a DE is similar to having a minor in a related discipline. In addition, the department, in conjunction with the School of Public Health, offers degrees in biostatistics through the Graduate Group in Biostatistics. There are two biostatistics graduate programs: MA and PhD. These programs are appropriate for students who have either a strong mathematical and statistical background with an interest in biomedical sciences, or degrees in the biological sciences with a major interest in mathematics and statistics. For further information, see the Biostatistics (http://sis.berkeley.edu/catalog/gcc_view_req?p_dept_cd=BIOSTAT) website. For course listings in Biostatistics, see the Public Health (http://sis.berkeley.edu/catalog/gcc_view_req?p_dept_cd=PB+HLTH) website.

The MA program includes both students who are admitted directly into the department and students obtaining advanced degrees in other departments at Berkeley. Coursework is typically tailored to individual interests, and credit toward the degree can be earned by related coursework in other departments.

Consulting Service

The Department of Statistics operates a consulting service in which advanced graduate students, under faculty supervision, are available as consultants during specified hours. The service is associated with the course Statistics 272, which may be taken for credit. Consulting is free to members of the campus community. Statistical advice can be sought at

any stage of the research process. Those seeking statistical advice are encouraged to contact consultants early in the research process. Refer to the Department of Statistics website (<http://www.stat.berkeley.edu>) to find out which faculty member is currently coordinating this service.

The Statistical Computing Facility

The Statistical Computing Facility (SCF) is a unit of the Department of Statistics. Its mission is to provide the undergraduate students, graduate students, postdocs, and faculty in the Statistics Department at Berkeley with state-of-the-art computing resources, services, and technical knowledge, supporting them in carrying out cutting-edge research activities, innovative instructional programs, and efficient day-to-day computing activities. The SCF also supports the students and faculty of the Econometrics Laboratory of the Department of Economics.

STAT 0PX Preparatory Statistics 1 Unit

Department: Statistics

Course level: Undergraduate

Term course may be offered: Summer

Grading: Offered for pass/not pass grade only.

Hours and format: 5 hours of Lecture and 4.5 hours of Workshop per week for 8 weeks. 5 hours of Lecture and 4.5 hours of Workshop per week for 6 weeks.

Prerequisites: Consent of instructor.

This course assists entering Freshman students with basic statistical concepts and problem solving. Designed for students who do not meet the prerequisites for 2. Offered through the Student Learning Center.

Instructor: Purves

STAT 2 Introduction to Statistics 4 Units

Department: Statistics

Course level: Undergraduate

Terms course may be offered: Fall, spring and summer

Grading: Letter grade.

Hours and format: 3 hours of Lecture and 2 hours of Laboratory per week for 15 weeks. 5 hours of Lecture and 4 hours of Laboratory per week for 8 weeks.

Population and variables. Standard measures of location, spread and association. Normal approximation. Regression. Probability and sampling. Binomial distribution. Interval estimation. Some standard significance tests.

Students who have taken 2X, 5, 20, 21, 21X, or 25 will receive no credit for 2.

STAT 20 Introduction to Probability and Statistics 4 Units

Department: Statistics

Course level: Undergraduate

Terms course may be offered: Fall, spring and summer

Grading: Letter grade.

Hours and format: 3 hours of Lecture and 2 hours of Laboratory per week for 15 weeks. 6 hours of Lecture and 3 hours of Laboratory per week for 8 weeks.

Prerequisites: One semester of calculus.

For students with mathematical background who wish to acquire basic concepts. Relative frequencies, discrete probability, random variables, expectation. Testing hypotheses. Estimation. Illustrations from various fields.

Students who have taken 2, 2X, 5, 21, 21X, or 25 will receive no credit for 20.

STAT 21 Introductory Probability and Statistics for Business 4 Units

Department: Statistics

Course level: Undergraduate

Terms course may be offered: Fall, spring and summer

Grading: Letter grade.

Hours and format: 3 hours of Lecture and 2 hours of Laboratory per week for 15 weeks. 5 hours of Lecture and 4 hours of Laboratory per week for 8 weeks.

Prerequisites: One semester of calculus.

Descriptive statistics, probability models and related concepts, sample surveys, estimates, confidence intervals, tests of significance, controlled experiments vs. observational studies, correlation and regression.

Students who have taken 2, 2X, 5, 20, 21X or 25 will receive no credit for 21. A deficiency in N21 may be moved by taking 21.

STAT W21 Introductory Probability and Statistics for Business 4 Units

Department: Statistics

Course level: Undergraduate

Terms course may be offered: Fall, spring and summer

Grading: Letter grade.

Hours and format: 3 hours of Web-based lecture per week for 15 weeks