

School of Arts and Sciences

STATISTICS

www.stat.pitt.edu

The field of statistical science is concerned with ways to explain variability in measurements. It is the science and art of making informed decisions in the face of uncertainty. Statistical reasoning is fundamental to research in many scientific fields. For example, probabilistic models of learning are used in education and psychology, and time series and regression models guide research in engineering, chemistry, economics, biology, and medicine. Recent court cases have shown the importance of the use of probability and statistics in law, especially in the fields of forensic medicine and DNA fingerprinting. Statisticians also have been instrumental in developing methods by which observations are obtained in many disciplines—for example, randomized clinical trials in medicine and complex sample surveys in social and political science. Probability and statistics are basic to the actuarial sciences. When lists are compiled of the most important scientific theories and discoveries of the last century, a substantial number of these developments are seen to be inherently statistical in nature.

The Department of Statistics offers course work leading to a Bachelor of Science degree in statistics. The department also offers a wide array of introductory service courses for general undergraduate audiences that deal with statistical methods in applications and require only high school mathematics. Students considering majoring in statistics should consult with a department advisor early in their studies, preferably during their freshman year. After declaring a major, students are assigned a faculty advisor.

Required Course Work for the Bachelor of Science Degree in Statistics

Statistics:

STAT 1000 Applied Statistics

An intensive introduction to statistical methods, this course is designed for students who want to do data analysis and study further ideas in applied statistics. The topics covered include descriptive statistics, elementary probability, random sampling, controlled experiments, hypothesis testing, regression, and analysis of variance.

STAT 1151 Introduction to Probability

This course presents, at both the theoretical and applied levels, the basic probability concepts required for statistical inference. The concepts to be discussed include the following: set theory and basic probability; independence and Bayes' theorem; discrete random variables and their distributions (e.g., Bernoulli, binomial, Poisson, and geometric); continuous random variables and their distributions (e.g., uniform, exponential, gamma, beta, and normal); transformation of random and conditional distributions; independent variables; and functions of random variables.

STAT 1152 Introduction to Mathematical Statistics

This course introduces the elementary concepts of statistical inference. Topics include functions of random variables, sampling distributions, decision criterion, estimation, hypothesis testing, regression, analysis of variance, and nonparametric methods.

STAT 1221 Applied Regression and Writing Component

This is an introductory course in regression analysis. MINITAB will be used in analyzing various data sets. This course covers simple linear regression (one variable) and one-way analysis of variance followed by more complicated regression models.



STAT 1631 Intermediate Mathematical Statistics

This course is the first half of a two-term sequence in mathematical statistics intended for undergraduate students and graduate applied statistics majors. Topics to be covered include probability of concepts, random variables, discrete and continuous variables, joint distributions, functions of random variables, and sampling distributions.

STAT 1632 Intermediate Mathematical Statistics 2

This course is the second half of a two-term sequence in mathematical statistics intended for undergraduate and graduate statistics majors. Topics to be covered include estimation, tests of hypotheses, confidence sets, sufficiency, the information inequality, and the approaches to inference of the two major schools of statistical thought—frequentist and Bayesian.

Two of the following introductory applied statistics courses:

STAT 1201 Applied Nonparametric Statistics
STAT 1211 Applied Categorical Data Analysis
STAT 1231 Applied Experimental Design
STAT 1241 Applied Sampling
STAT 1251 Statistical Quality Control
STAT 1291–1294 Topics in Applied Statistics I–IV

One of the following intermediate applied statistics courses:

STAT 1301 Statistical Packages
STAT 1311 Applied Multivariate Analysis
STAT 1321 Applied Time Series

One topic course from the following:

STAT 1651 Bayesian Statistics
STAT 1661 Linear Regression
STAT 1662 Nonlinear Regression
STAT 1731 Stochastic Processes
STAT 1741 Applied Probability Theory
STAT 1761 Game Theory
STAT 1781 Combinatorics
STAT 1791–1794 Topics in Probability and Statistics I–IV

Mathematics:

MATH 0220 Analytic Geometry and Calculus 1
MATH 0230 Analytic Geometry and Calculus 2
MATH 0240 Analytic Geometry and Calculus 3
and
MATH 0280 Introduction to Matrices and Linear Algebra or MATH 1180 Linear Algebra 1

Electives:

One elective course in statistics from STAT 12XX, 13XX, 16XX, or 17XX.

With approval of their major advisor, students may substitute STAT 0200 with a minimum grade of B- for STAT 1000. Statistics-business dual majors may, with approval, substitute STAT 1100 for STAT 1000. Because professional statisticians collaborate with other scientists, students are encouraged to take elective courses from the behavioral, natural, physical, and social sciences.

In order for students to be able to communicate their findings to others, courses in technical writing and public speaking also are recommended. Students planning to continue their studies in graduate school are strongly advised to take MATH 0413, MATH 0420, and MATH 1180 and as many additional mathematics courses in advanced calculus (MATH 1530, 1540); numerical analysis (MATH 1070, 1110); and computer science (CS 0002, 0003, 0004, 0007, 0401, 0132) as possible.

Fields that are open to graduates with a BS in statistics

- Actuarial Science
- Biology
- Business and Finance
- Economics
- Education
- Engineering
- Government
- Health and Medicine
- Insurance
- Legal Profession
- Pharmaceuticals
- Psychology
- Quality Control
- Social Sciences

For more information about the statistics program, contact:

University of Pittsburgh
School of Arts and Sciences
Department of Statistics
2717 Cathedral of Learning
Pittsburgh, PA 15260
412-624-8368
E-mail: cboden@pitt.edu or wesleyt@pitt.edu
www.stat.pitt.edu

For more information about other majors, contact:

University of Pittsburgh
Office of Admissions and Financial Aid
Alumni Hall, 4227 Fifth Avenue
Pittsburgh, PA 15260-6601
412-624-PITT
E-mail: oafa@pitt.edu
www.oafa.pitt.edu

Special Programs and Opportunities

Undergraduate Internship

The Department of Statistics offers undergraduate students the opportunity to participate in an internship at the undergraduate level. The primary purpose of the internship is to provide real-world experience to the student in applying statistical methods in business, government, or industry. Major parts of this process are initiative, creativity, and communication.

Study Abroad

These programs add an international perspective to your education and strengthen your credentials as a graduate. While earning credits toward your Bachelor of Science degree in statistics, you can broaden your personal experience and gain an appreciation for other cultures. Scholarships are available for study abroad opportunities.

