

Kenneth P. Dietrich School of Arts and Sciences
College in High School

2024-2025
Basic Applied Statistics
STAT 0200--4 Credits

Description: This course teaches methods of descriptive and inferential statistics. Topics include data collection and description, probability, hypothesis testing, correlation and regression, the analysis of variance, and contingency tables (chi square). Students will learn how to use a statistical computer package.

Prerequisites: Two years of high school algebra are recommended.

Grading: The grade is determined by the student's performance on two mid-term exams, a comprehensive final, and teacher evaluation.

Textbook: The recommended textbook is *Statistics: Learning from Data*, 2nd ed., by Roxy Peck & Tom Short. Also recommended is *Statistics and Data Analysis*, 6th ed. by Roxy Peck, Tom Short, and Chris Olsen. Alternate textbooks may be used but must include the material in this course outline.

The following topics are covered in the University of Pittsburgh STAT 0200 course. The statistical package is used for all topics below:

1. **Introduction:** What is statistics? Types of data.
2. **Descriptive statistics (one variable):** Histograms, box plots, symmetry and skewness, mean, median, percentiles, range, interquartile range, the standard deviation.
3. **Association and Regression:** Scatter plots, correlation, fitting straight lines, meaning of slope and intercept, residuals, coefficient of determination (r-squared).
4. **Causation and Evidence:** Use of observational studies or experiments to attempt to answer questions of causation. Some basic types of sampling and experiments-stratified samples, simple and blocked designs.
5. **Probability:** Random variables and their distributions: Basic probability rules, discrete random variables, rules for means and variances. Statistical independence, independent observations. Normal and binomial distributions.
6. **Distribution of sample proportion and distribution of sample mean from random samples:** Central limit theorem, law of large numbers. Hands-on or computer simulations of sampling distributions.
7. **Confidence intervals for means (known standard deviation) and proportions in one sample:** Construct confidence intervals from Data; use computer experiments to illustrate concept.
8. **Tests of hypotheses about means (known standard deviation) and proportions in one sample:** P-value, level of significance. Type I and Type II error. Meaning of (but not calculation of) power and relation to effect size, sample size, and size of standard deviation. Computer experiments to illustrate these concepts.

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9. **One-sample, paired-sample, and two-sample t-tests:** Degrees of freedom and use of t-tables. Related confidence intervals. Interpretation of computer output concerning tests and confidence intervals. Advantages and disadvantages of paired designs over two-sample designs.
10. **Introduction to more advanced topics:** One-way analysis of variance tests (ANOVA table, degrees of freedom, sums of squares and mean squares, F statistic and F tables), contingency tables and chi-square tests for independence, inference concerning the slope(s) and intercept in linear regression models.

Additional course credit information for STAT 0200:

At the University of Pittsburgh:

- **Majors:** This is a course that can be used for some social sciences. Students intending to major in a math- or science-related field should not take this course and would need to take a statistics course for science majors such as the University of Pittsburgh's STAT 1000
- **Electives:** Individual Schools and Colleges of the University (such as Engineering, Arts & Sciences, Business, Information Sciences, and so on) have different policies about elective credits and may count this course as an elective. Students interested in studying at the University of Pittsburgh should contact their School/College of interest to see if this course would be counted
- **Graduation:** This course's credits count toward the number of credits needed for graduation

Academic Integrity: All College in High School teachers, students, and their parents/guardians are required to review and be familiar with the University of Pittsburgh's Academic Integrity Policy located online at <https://www.as.pitt.edu/faculty/policies-and-procedures/academic-integrity-code>.

Grades: Grade criteria in the high school course may differ slightly from University of Pittsburgh standards. A CHS student could receive two course grades: one for high school and one for the University transcript. In most cases the grades are the same. These grading standards are explained at the beginning of each course.

Transfer Credit: University of Pittsburgh grades earned in CHS courses appear on an official University of Pittsburgh transcript, and the course credits are likely to be eligible for transfer to other colleges and universities. Students are encouraged to contact potential colleges and universities in advance to ensure their CHS credits would be accepted. If students decide to attend any University of Pittsburgh campuses, the University of Pittsburgh grade earned in the course will count toward the student grade point average at the University. At the University of Pittsburgh, the CHS course supersedes any equivalent AP credit.

Drops and Withdrawals: Students should monitor progress in a course. CHS teacher can obtain a Course Drop/Withdrawal Request form from the CHS office or Aspire. The form must be completed by the student, teacher and parent/guardian and returned to teacher by deadlines listed. Dropping and withdrawing from the CHS course has no effect on enrollment in the high school credits for the course.