BOCES
Western Suffolk

Online Courses for High School Students
1-888-972-6237

AP Statistics

Course Description:

Statistics—the art of drawing conclusions from imperfect data and the science of real-world uncertainties—plays an important role in many fields. Students collect, analyze, graph, and interpret real-world data. They learn to design and analyze research studies by reviewing and evaluating examples from real research. Students prepare for the AP Exam and for further study in science, sociology, medicine, engineering, political science, geography, and business.

Prerequisites: Successful completion of Algebra II and a teacher/counselor recommendation
Course Length: Two Semesters
Required Text: The following are **optional text** purchases and are not required for the successful completion of the course.

- Sternstein, M. (2004). Barron's How to Prepare for the AP Statistics: Advanced Placement Test in Statistics. 3rd Ed. New York: Barron's.
- Mendenhall, W., Beaver, R. J. & Beaver, B. M. (2005). Introduction to Probability and Statistics. 12th Ed. Belmont, CA: Thomson-Brooks/Cole.

Materials List: Graphing calculator such as the TI-84 Plus, TI-83, or TI-83 Plus

AP Statistics - Part A

Course Outline:

Unit 1: Describing Data
Students take a pre-course assessment to be sure they are ready for the challenge of AP Statistics. They explore what statistics is, how it can be used, and how it's misused. They learn some basic statistics terminology, and look at the difference between counts and measures and the difference between descriptive and inferential statistics.

- What Is Statistics?
- Displaying Distributions with Graphs
- Describing Distributions Using Numbers
- Five-Number Summaries
- More on Describing Distributions

Unit 2: The Normal Distribution
Students learn about the normal distribution and the normal curve—a display of a normal distribution on a graph; the normal curve presents the normal distribution in a form that statisticians can use as a tool in inferential statistics.

- Introduction to the Normal Distribution
- Standardized Scores
- Determining If a Data Set Is Normal

Unit 3: Bivariate Data
Students learn how statistics can be used to study how one variable affects another—for instance, do people who spend more years in school earn more money? Do people who take an experimental drug suffer fewer heart attacks? To answer questions like these, researchers need to gather data on two variables and then examine the data to see how the variables might be related.

- Introduction to Bivariate Data
- The Least-Squares Regression Line
- The Correlation Coefficient
- Influential Points and Outliers
- Transformations to Achieve Linearity
- Categorical Bivariate Data: Two-Way Tables

Unit 4: Planning a Study
Students look at some of the most important issues in data gathering. They learn how this can make them smarter consumers of data; when they hear or read about studies, they will be able to determine whether or not they are valid.

- Methods of Data Collection—Experiments and Studies
- Methods of Data Collection—Surveys

Unit 5: Probability
Students look at probability, which is vital for inferential statistics. They determine how likely it is that a sample really represents the population as a whole through proper sampling techniques and the laws of probability.

- What Is Probability?
- Introduction to the Basic Rules of Probability
- More on Conditional Probabilities and the Probabilities of Combined Events
- Probability Distributions
- Means and Variances of Random Variables
- Review and Exam

AP Statistics- Part B

Unit 1: Binomials and Distributions
Students start to work with sampling distributions, which are distributions of possible sample means.

- Introduction to Inferential Statistics
- Binomial Distributions
- Geometric Distribution
- Sampling Distributions: Means and Proportions

Unit 2: Introduction to Inference
Students look at concepts of sampling, probability, and distributions and are introduced to processes that researchers use to do statistical inference.

- Confidence Intervals for Means
- Statistical Significance and P-Value
- Significance and Hypothesis Testing: Means
- Errors in Hypothesis Testing

Unit 3: t Distribution for Means
Students review and reinforce many concepts that they may already know about statistical inference, learning a new dimension that's vital to anyone doing inferential statistics in the real world.

- Confidence Intervals and Hypothesis Testing for a Single Mean
- Confidence Intervals for the Difference between Two Means
- Confidence Intervals and Hypothesis Tests for Two Independent Samples

Unit 4: Inference for Proportions
Students learn the basics of how to infer a population proportion based on a sample.

- Confidence Intervals and Hypothesis Tests for a Single Population Proportion
- The Difference between Two Proportions

Unit 5: Inference for Tables and Least-Squares
Students build on what they've learned about analyzing bivariate sample data. They go beyond looking at the sample and make inferences about the population.

- One-Way Tables: Chi-Square for Goodness-of-Fit
- Two-Way Tables: Chi-Square for Association or Independence
- Inference for the Least-Squares Line

Unit 6: Final Preparation for the AP Statistics Exam

Students review what they have learned and take the final exam.

- General Preparation Strategies
- Strategies and Practice for Multiple-Choice and Free-Response Questions
- Putting It Together: Practice Exam and Mixed Practice
- Final Exam