

AP Statistics Course and Exam Description

AP Statistics Course Overview

The AP Statistics course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes evident in the content, skills, and assessment in the AP Statistics course: exploring data, sampling and experimentation, probability and simulation, and statistical inference. Students use technology, investigations, problem solving, and writing as they build conceptual understanding. The AP Statistics course is equivalent to a one-semester, introductory, non-calculus-based college course in statistics.

PREREQUISITES

The AP Statistics course is an excellent option for any secondary school student who has successfully completed a second-year course in algebra and who possesses sufficient mathematical maturity and quantitative reasoning ability.

AP Statistics Course Content

The course content is organized into nine commonly taught units, which have been arranged in the following suggested, logical sequence:

- Unit 1: Exploring One-Variable Data
- Unit 2: Exploring Two-Variable Data
- Unit 3: Collecting Data
- Unit 4: Probability, Random Variables, and Probability Distributions
- Unit 5: Sampling Distributions
- Unit 6: Inference for Categorical Data: Proportions
- Unit 7: Inference for Quantitative Data: Means
- Unit 8: Inference for Categorical Data: Chi-Square
- Unit 9: Inference for Quantitative Data: Slopes

Big Ideas

- **Variation and Distribution:** The distribution of measures for individuals within a sample or population describes variation. The value of a statistic varies from sample to sample. How can we determine whether differences between measures represent random variation or meaningful distinctions? Statistical methods based on probabilistic reasoning provide the basis for shared understandings about variation and about the likelihood that variation between and among measures, samples, and populations is random or meaningful.
- **Patterns and Uncertainty:** Statistical tools allow us to represent and describe patterns in data and to classify departures from patterns. Simulation and probabilistic reasoning allow us to anticipate patterns in data and to determine the likelihood of errors in inference.
- **Data-Based Predictions, Decisions, and Conclusions:** Data-based regression models describe relationships between variables and are a tool for making predictions for values of a response variable. Collecting data using random sampling or randomized experimental design

means that findings may be generalized to the part of the population from which the selection was made. Statistical inference allows us to make data-based decisions.

AP Statistics Course Skills

Students should develop course skills in the following skills categories:

- Selecting Statistical Methods: Select methods for collecting and/or analyzing data for statistical inference.
- Data Analysis: Describe patterns, trends, associations, and relationships in data.
- Using Probability and Simulation: Explore random phenomena.
- Statistical Argumentation: Develop an explanation or justify a conclusion using evidence from data, definitions, or statistical inference.

AP Statistics course and exam	
UNIT 1 EXPLORING ONE-VARIABLE DATA	
1.1	Introducing Statistics: What Can We Learn from Data?
1.2	The Language of Variation: Variables
1.3	Representing a Categorical Variable with Tables
1.4	Representing a Categorical Variable with Graphs
1.5	Representing a Quantitative Variable with Graphs
1.6	Describing the Distribution of a Quantitative Variable
1.7	Summary Statistics for a Quantitative Variable
1.8	Graphical Representations of Summary Statistics
1.9	Comparing Distributions of a Quantitative Variable
1.10	The Normal Distribution

UNIT 2 EXPLORING TWO-VARIABLE DATA

2.1 Introducing Statistics: Are Variables Related?

2.2 Representing Two Categorical Variables

2.3 Statistics for Two Categorical Variables

2.4 Representing the Relationship Between Two Quantitative Variables

2.5 Correlation

2.6 Linear Regression Models

2.7 Residuals

2.8 Least Squares Regression

2.9 Analyzing Departures from Linearity

UNIT 3 COLLECTING DATA

3.1 Introducing Statistics: Do the Data We Collected Tell the Truth?

3.2 Introduction to Planning a Study

3.3 Random Sampling and Data Collection

3.4 Potential Problems with Sampling

3.5 Introduction to Experimental Design

3.6 Selecting an Experimental Design

3.7 Inference and Experiments

UNIT 4 PROBABILITY, RANDOM VARIABLES, AND PROBABILITY DISTRIBUTIONS

4.1 Definition and Conservation of Electric Charge

4.2 Estimating Probabilities Using Simulation

4.3 Introduction to Probability

4.4 Mutually Exclusive Events

4.5 Conditional Probability

4.6 Independent Events and Unions of Events

4.7 Introduction to Random Variables and Probability Distributions

4.8 Mean and Standard Deviation of Random Variables

4.9 Combining Random Variables

4.10 Introduction to the Binomial Distribution

4.11 Parameters for a Binomial Distribution

4.12 The Geometric Distribution

UNIT 5 SAMPLING DISTRIBUTIONS

5.1 Introducing Statistics: Why Is My Sample Not Like Yours?

5.2 The Normal Distribution, Revisited

5.3 The Central Limit Theorem

5.4 Biased and Unbiased Point Estimates

5.5 Sampling Distributions for Sample Proportions

5.6 Sampling Distributions for Differences in Sample Proportions

5.7 Sampling Distributions for Sample Means

5.8 Sampling Distributions for Differences in Sample Means

UNIT 6 INFERENCE FOR CATEGORICAL DATA: PROPORTIONS

6.1 Introducing Statistics: Why Be Normal?

6.2 Constructing a Confidence Interval for a Population Proportion

6.3 Justifying a Claim Based on a Confidence Interval for a Population Proportion

6.4 Setting Up a Test for a Population Proportion

6.5 Interpreting p-Values

6.6 Concluding a Test for a Population Proportion

6.7 Potential Errors When Performing Tests

6.8 Confidence Intervals for the Difference of Two Proportions

6.9 Justifying a Claim Based on a Confidence Interval for a Difference of Population Proportions

6.10 Setting Up a Test for the Difference of Two Population Proportions

6.11 Carrying Out a Test for the Difference of Two Population Proportions

UNIT 7

7.1 Systems and Fundamental Forces

7.2 Radioactive Decay

7.3 Energy in Modern Physics (Energy in Radioactive Decay and $E=mc^2$)

7.4 Mass-Energy Equivalence

7.5 Carrying Out a Test for a Population Mean

7.6 Confidence Intervals for the Difference of Two Means

7.7 Justifying a Claim About the Difference of Two Means Based on a Confidence Interval

7.8	Setting Up a Test for the Difference of Two Population Means
7.9	Carrying Out a Test for the Difference of Two Population Means
7.10	Skills Focus: Selecting, Implementing, and Communicating Inference Procedures
UNIT 8 INFERENCE FOR CATEGORICAL DATA: CHI-SQUARE	
8.1	Introducing Statistics: Are My Results Unexpected?
8.2	Setting Up a Chi-Square Goodness of Fit Test
8.3	Carrying Out a Chi-Square Test for Goodness of Fit
8.4	Expected Counts in Two-Way Tables
8.5	Setting Up a Chi-Square Test for Homogeneity or Independence
8.6	Carrying Out a Chi-Square Test for Homogeneity or Independence
8.7	Skills Focus: Selecting an Appropriate Inference Procedure for Categorical Data

AP Statistics EXAM: 3 Hours

The AP Statistics Exam assesses student understanding of the skills and learning objectives outlined in the course framework. The exam is 3 hours long and includes 40 multiple-choice questions and 6 free-response questions.

Další informace:

AP Statistics Course Overview – 2 stránky

<https://apcentral.collegeboard.org/pdf/ap-statistics-course-overview.pdf?course=ap-statistics>

AP Statistics Course at a glance – 4 strany

<https://apcentral.collegeboard.org/pdf/ap-statistics-course-a-glance.pdf?course=ap-statistics>

AP Statistics Course and Exam Description – 278 stran

<https://apcentral.collegeboard.org/pdf/ap-statistics-course-and-exam-description.pdf?course=ap-statistics>

Příklady zkouškových otázek

<https://apcentral.collegeboard.org/pdf/ap21-frq-statistics.pdf?course=ap-statistics>