AP Statistics Syllabus Course Overview

This course provides a college-level introduction to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students will learn to explore patterns, plan studies, anticipate patterns using probability, and use statistical inference to confirm models.

Unit 1: Descriptive Statistics & Data Analysis

- **Ch 1 & 2: Introduction to Data and the Normal Distribution**

An introduction to the foundations of statistical thinking. Students learn to describe and summarize data using graphical displays (like boxplots and histograms) and numerical measures of center and spread. This unit also introduces the Normal Distribution and how to use z-scores to calculate relative standing.

- **Ch 3 & 4: Correlation and Least-Squares Regression**

Students explore relationships between two quantitative variables. Topics include creating scatterplots, calculating the correlation coefficient (r), and determining the line of best fit to make predictions and analyze residuals.

Unit 2: Data Collection & Probability

- **Ch 5: Data Collection and Experimental Design**

A look at how data is gathered. Students study sampling methods (random, stratified, etc.), sources of bias, and the essential components of a well-designed experiment, such as control, randomization, and replication.

- **Ch 6: Probability Fundamentals**

This chapter covers the mathematical laws governing chance. Students learn about independent and mutually exclusive events, Venn diagrams, and conditional probability.

- **Ch 7: Random Variables and Distributions**

Moving from basic probability to random variables. Students learn to calculate the mean (expected value) and standard deviation of probability distributions and how to combine random variables.

- **Ch 8: Binomial and Geometric Distributions**

Focuses on specific probability models used when there are two possible outcomes (success/failure). Students learn to identify and calculate probabilities for binomial and geometric scenarios.

Unit 3: Statistical Inference

- **Ch 9: Sampling Distributions & The Central Limit Theorem**

The bridge between descriptive and inferential statistics. This unit explains how sample statistics vary and introduces the Central Limit Theorem, which allows us to use the Normal model for inference.

- **Ch 10: Confidence Intervals**

Students learn how to estimate population parameters with a margin of error. This includes constructing and interpreting confidence intervals for proportions and means.

- **Ch 11: Significance Testing**

The "formal" process of statistical decision-making. Students learn to state hypotheses, calculate p-values, and draw conclusions about the validity of a claim.

- **Ch 12 & 13: Comparing Two Groups**

Extending inference to compare two different populations. Students analyze the difference between two proportions or two means using intervals and tests.

- **Ch 14: Chi-Square Tests for Categorical Data**

Focuses on categorical data to see if an observed distribution fits an expected one (Goodness of Fit) or if two categorical variables are independent.

- **Ch 15: Inference for Regression**

The final chapter applies inference techniques to the slope of a regression line to determine if a significant linear relationship exists between two variables in a population.