AP Statistics

Gyaanbhoomi Academic Curriculum

Course Description

AP Statistics introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. This course is equivalent to a one-semester, introductory college statistics course. Students cultivate their understanding of statistics using technology, investigations, problem solving, and writing as they explore concepts like variation and distribution; patterns and uncertainty; and data-based predictions, decisions, and conclusions.

Topics Covered

Unit 1: Exploring Data

- Analyzing One-Variable Data (Shape, Center, Spread, Outliers)
- The Normal Distribution and Z-Scores
- Analyzing Two-Variable Data (Scatterplots, Correlation, Regression)
- Least-Squares Regression Line (LSRL) and Residuals

Unit 2: Sampling and Experimentation

- Methods of Data Collection: Sampling and Surveys (SRS, Stratified, Cluster)
- Planning and Conducting Experiments (Control, Randomization, Replication)
- Avoiding Bias in Data Collection

Unit 3: Probability and Random Variables

- Probability Rules, Conditional Probability, and Independence
- Discrete Random Variables (Binomial and Geometric Distributions)
- Continuous Random Variables and the Normal Distribution
- Combining Random Variables

Unit 4: Sampling Distributions

- The Central Limit Theorem (CLT)
- Sampling Distributions for Sample Proportions ($\hat{p}$)

- Sampling Distributions for Sample Means ($\bar{x}$)

Unit 5: Inference for Proportions

- Confidence Intervals for One and Two Proportions
- Significance (Hypothesis) Tests for One Proportion ($H_0 : p = p_0$)
- Significance Tests for the Difference of Two Proportions
- Type I, Type II Errors, and the Power of a Test

Unit 6: Inference for Means

- Confidence Intervals for One and Two Means (t-distributions)
- Significance Tests for One Mean ($H_0 : \mu = \mu_0$)
- Significance Tests for the Difference of Two Means
- Paired Data t-Procedures

Unit 7: Inference for Categorical Data and Regression

- Chi-Square (χ^2) Test for Goodness-of-Fit
- Chi-Square Test for Homogeneity and Independence
- Confidence Interval for the Slope of a Regression Line
- Significance Test for the Slope of a Regression Line (β_1)