



Ephrata High School
Course Syllabus
AP Statistics
#3305



I. Course Description

Statistics is a widely applicable branch of mathematics that is required in a variety of college majors and careers. The content tested by the AP Statistics examination will dictate the syllabus for this course. Statistics may be taken in conjunction with another math course in the junior or senior year. Students who do well may choose to take the AP Statistics exam. A TI-83+ graphing calculator is required.

II. Materials & Equipment

Text, Calculator, Rossman Workbook, Supplemental Worksheets, Computer, AP Review Materials

III. Course Goals & Objectives

Enduring Understandings: Students will understand how to:

- Define and recognize categorical, quantitative, and ordinal variables
- Display distributions graphically using bar graphs, histograms, dotplots, stemplots, and boxplots
- Describe distributions as skewed or symmetrical
- Analyze distributions for center, spread, clusters, gaps, and shape
- Calculate mean, median, mode, and quartiles
- Calculate range, variance and standard deviation
- Identify outliers
- Define density curve
- Calculate area under density curves
- Define normal curve and identify its features
- Define standard normal curve
- Calculate z-scores
- Calculate areas under the standard normal curve
- Create and analyze scatterplots
- Identify explanatory and response variables
- Recognize positive and negative associations
- Use the 4-step procedure to analyze association:
 1. Examine scatterplot
 2. Calculate and graph Least Squares Regression Line
 3. Check correlation coefficient
 4. Check residual plot
- Recognize outliers and influential points
- Use nonlinear models of regression
- Perform linear transformations on nonlinear data
- Define and recognize elements of experiments
- Design experiments
- Use sampling techniques such as stratifying, blocking, and multistaging appropriately
- Identify weaknesses in experimental designs
- Conduct simulations of experiments
- Define randomness
- Define probability
- Define and list sample spaces
- Define outcomes and events
- Apply multiplication and addition principles of probability
- Use tree diagrams to calculate conditional probabilities
- Define discrete and continuous random variables
- Draw probability histograms
- Calculate mean, variance, and standard deviation of discrete probability distributions
- Calculate probabilities using standard normal curve
- Develop the Law of Large Numbers

- Use Binomial and Geometric probability distributions
- Define sampling distribution
- Discuss bias in sampling
- Develop the Central Limit Theorem
- Recognize effects of changing parameters on confidence intervals
- Obtain required margin of error by adjusting the sample size and confidence levels
- Test hypotheses involving means
- Define and recognize statistical significance
- Define Type I and Type II errors, level of significance, and power
- Conduct simple t-tests, matched pairs t-tests, and differences of means t-tests
- Define and recognize robustness in statistical procedures
- Calculate confidence intervals and conduct hypothesis tests for populations proportions and difference of proportions
- Conduct χ^2 tests for goodness of fit and independence
- Review regression procedures
- Calculate confidence intervals for regression slope
- Conduct hypothesis test for regression slope
- Review assumptions for various statistical procedures

IV. Course Topics (Summary Outline)

I. Describing Distributions

- Types of variables
- Visual representations
- Numerical representations

II. Normal Curve

- Density curve
- Normal Curve

III. Regression

- Association
- Regression

IV. Experimental Design

- Experimental design

VI. Probability

- Basic probability
- Conditional probability
- Probability distributions
- Special probabilities

VII. Central Limit Theorem

- Sampling distributions
- Central Limit Theorem
- Using inferential statistics

VIII. Inferential Procedures

- Inference for means
- Inference for proportions
- Nonparametric inferences
- Inference for regression

V. Assignments & Grading

Homework will be assigned on a daily basis. Grades will be based on quizzes, tests, group activities, and projects. All students will complete a final project or take a final examination (to be decided by each class). The Ephrata High School grading system and scale will be used to determine letter grades.