TEACHING ELEMENTARY STATISTICS

FROM A TO Z

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TEACHING METHODS:

• In class group projects are assigned as often as possible. This reinforces the material that was just taught.

• Homework is assigned daily. It is not collected, but students need to do it in order to learn the material.

• Quizzes are given every two or three class periods to keep students on task.

• I give three exams throughout the semester. Each exam covers the material since the previous exam. I give a cumulative final exam during exam week.

COURSE STRUCTURE:

- Elementary Statistics meets twice per week with each meeting being 75 minutes.

- Format of Each Class:

1. Go over the previous class period's group project or quiz.

2. Take questions on homework.

3. Teach the day's lesson.

4. Assign group project or take quiz.

- There are 14 weeks in each semester thus giving a total of 28 class periods – A to Z (plus two additional class periods for review, snow days, etc.)

Lesson A: Introduction. Quantitative vs Qualitative Data, Charts and Graphs

LOCATION OF DATA

Lesson B: Percentiles, Box Plot, Five-Number Summary
GROUP PROJECT

Lesson C: Standard Deviation, z-Scores, Chebyshev's Theorem
QUIZ ON LESSONS A AND B

x_i	$x_i - \overline{x}$	$(x_i - \overline{x})^2$

Lesson D: Linear Regression: Scatter Plot, Eastimated Linear Regression Equation, r^2.

x_i	$x_i - \overline{x}$	$(x_i - \overline{x})^2$	y_i	$y_i - \overline{y}$	$(y_i - \overline{y})^2$	$(x_i - \overline{x})(y_i - \overline{y})$

PROBABILITY

Lesson E: Introduction to Probability: Sample Spaces, Probability of intersections and unions, mutually exclusive events, Probability Distributions
QUIZ ON LESSONS C AND D

x_i	$x_i - \overline{x}$	$(x_i - \overline{x})^2$	$P(x_i)$	$(x_i - \overline{x})^2 P(x_i)$

Lesson F: Conditional Probability: Interpretations, Formulas for computing, Independent vs Dependent Events
GROUP PROJECT FOR LESSONS E AND F

Lesson G: Review for Exam I

Lesson H: Exam I (covers Lessons A-F)

COUNTING

Lesson I: Counting: Permutations and Combinations, Applications to Probability
GROUP PROJECT

Lesson J: The Binomial Distribution
GROUP PROJECT

THE NORMAL DISTRIBUTION

Lesson K: Using the normal curve chart to find probabilities resulting from given z-scores, Applications
QUIZ ON LESSONS I AND J

Lesson L: Using the normal curve chart to find z-scores resulting from given probabilities, Applications
GROUP PROJECT ON LESSONS K AND L

Lesson M: The normal approximation to the binomial distribution.
QUIZ ON LESSONS K AND L

Lesson N: Review for Exam II

Lesson O: Exam II (covers Lessons I-M)

Lesson P: Central Limit Theorem
GROUP PROJECT

CONFIDENCE INTERVALS

Lesson Q: Confidence Intervals for Means – Large Sample Size, Determining the Sample Size
GROUP PROJECT

Lesson R: Confidence Intervals for Means – Small Sample Size, The t-distribution.
QUIZ ON LESSONS P AND Q

Lesson S: Confidence Intervals for Proportions
GROUP PROJECT

Lesson T: Confidence Intervals for the Standard Deviation (Chi-Square)
QUIZ ON LESSONS R AND S

Lesson U: Review for Exam III

Lesson V: Exam III (covers Lessons P-T)

HYPOTHESIS TESTING

Lesson W: Introduction to Hypothesis Testing – Determining the Null and Alternative Hypotheses, Type I and Type II errors and their consequences

Lesson X: Hypothesis Testing for Means
GROUP PROJECT

Lesson Y: Hypothesis Testing for Proportions
GROUP PROJECT

Lesson Z: Hypothesis Testing for the Standard Deviation
QUIZ ON LESSONS W, X, AND Y

The remaining class or two are used as make-up classes and review for the cumulative final exam.