

TPHS Course Profile



Statistical Reasoning in Sports

Open to any grade level after successful completion of Integrated Math 3 (College Prep or Honors) (10 Credits)

- Meets high school graduation requirement for math credits
- Meets the UC/CSU subject area "C-Mathematics" requirement

General Information

Description

In Statistics students will learn concepts such as

- Graphically displaying and interpreting data.
- Probability, correlation, and regression.
- Statistical significance and inference.
- Perform simulation that mimic the observed sports data.

Expectations and Goals

Students should have:

- A "C" or better in Integrated Math 3 College Prep or Honors

Students entering Statistics should already have a good understanding of the following concepts:

- Basic math skills, especially solving for variables in equations.
- Identifying slope from graphs, equations, and word problems.
- Students should also have strong reading skills to be able to understand and interpret a variety of word problems and explanations of concepts.

Students entering Statistics should also be able to solve problems such as

<u>Equation Problem:</u> Given $z = \frac{x-\bar{x}}{s_x}$ and $z=1.28$, $\bar{x} = 72$ and $s_x = 7.9$. Find x .	<u>Word Problem:</u> If Tom Brady had the following passing yards in his last 8 games, find the mean and median. 225, 251, 199, 310, 181, 288, 256, 233
<u>Graphing Problem:</u> Display Tom Brady's passing yardage in a Histogram (bar chart)	

Students entering Statistics are expected to do the following:

- Have a desire to learn this subject.
- Attend and participate in class every day.
- Thoroughly complete homework and reading assignments.
- Work in groups.
- Seek help when needed.

Estimated Homework

Students will be expected to spend about ½ hour to 1 hour outside of class on homework for each class period. (This is a general guideline for planning and scheduling purposes. A student's individual ability level and competency may affect the actual preparation times needed.)

There may also be projects such as

- Gathering, displaying, and analyzing data.
- Group activities and labs to collect data and interpret results.

This Class Is Best For...

This course teaches students how to use four-steps of the statistical process in the context of sports: ask questions, collect data, analyze data, and make conclusions. Each chapter will begin with a sports-related statistical question (e.g., Is there a home field advantage in the NFL?) and then students will learn how to collect appropriate data, how to analyze the data, and how to make reasonable conclusions. Although the context of the examples and exercises will be sports related, the primary focus of the class will be to teach students the basic principles of statistical reasoning. Major statistical topics include: analyzing distributions of univariate and bivariate data, both categorical and numerical, using graphs and summary statistics; correlation and least squares regression; using simulations to estimate probability distributions; theoretical probability distributions, including the binomial and normal distributions; rules of probability, including conditional probability and expected value; the logic of hypothesis testing, including stating hypotheses, calculating and interpreting p-values, drawing conclusions, and Type I and Type II errors; using confidence intervals to estimate parameters; and proper methods of data collection, including sampling and experimentation. Use of technology, including online applets and the graphing calculator will be prominent in the course. Throughout the course, students will complete investigations that require students to complete the four-step statistical process using athletes of their choice.

Course Materials

Required Materials

Text book: *Statistical Reasoning in Sports*, 1st Edition, Macmillan Learning, 2011 Tabor & Franklin