

Statistical Reasoning in Sports

Fall 2014

M-W-F 10-10:50

Prof. Jeff Kallenbach
Science 29B
264-7641

Course Description: This course will teach 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.

Text: *Statistical Reasoning in Sports*, Josh Tabor and Chris Franklin (2011), W. H. Freeman and Company: ISBN-10: **1464114056** | ISBN-13: **978-1464114052** | Edition: **First Edition** **I am using the paperback version.** The text web site is [here](#).

Statistical Package and Computing

The TI-Nspire graphing calculator will be used throughout the course. I will be using [Engrade](#)... a site where you are able to access your grades, homework, and notes. Proper maintenance of computer accounts, files, etc. is your responsibility. I recommend that you **back up your data sets and worksheets on a regular basis**. I will not assume you have prior experience with the data portion of the Nspire calculator or statistical software so you do not need to be concerned about the use of technology in the classroom as a prerequisite. However, we will be using technology extensively in the course, so becoming familiar with the technology and applications will be very important.

Learning Disabilities

If a student is in need of an accommodation based on the impact of your disability, you should contact me to arrange an appointment. At the appointment we can discuss the course format, anticipate your needs and explore potential accommodations. I rely on the Office for Students with Disabilities for assistance in verifying the need for accommodations and developing accommodation strategies. If you have not previously registered with the Office for Students with Disabilities, I encourage you to do so. Just a reminder, requests for accommodations are not retroactive.

Homework & Activities

Homework and lab assignments (these will be called 'Investigations') will be given throughout the semester. Subsets of these assignments may be collected and graded frequently. You should work on as many problems as possible. This includes problems which have not been assigned. All papers that you turn in must be legible with problem numbers and solutions clearly marked. I encourage you to discuss the concepts and problem solving

techniques presented in class with other students. However, you must submit your own solution for each of the assigned problems to be collected.

Help!

I do have daily office hours but please feel free to stop by and see me at any time. I will always try to make time to respond to your questions. You may call me or e-mail me as well. In addition, tutors are available throughout the semester. Hours are posted on the bulletin board outside the Math Lab. The tutors can help you with technical calculator and software questions or general questions about the course material, but they will not solve your homework problems.

Resources

Helpful information may be found at any of the following places:

- [Engrade](#)
- [Text book web site](#)
- [My web site](#)
- **Math cave (SC26)**

Late Policy

Assignments must be turned in on the assigned due date. No credit will be given for late papers. If for any reason you cannot turn in your paper on the assigned date, you must contact me before class. You may contact me at jkallenb@sienaheights.edu or 264-7641 or you can leave a message with Martha Ruesink.

Quizzes

Short quizzes will be given *frequently*. I use quizzes so both of us can be informed of the progress toward the learning of statistics in the course. There won't be any make-up quizzes, but I will drop your lowest quiz grade at the end in case you miss one.

Final Project

Each student will find a data set and apply an appropriate statistical analysis. More on this as the semester progress.

Grade

Your course grade will be based on your overall percentage. The categories used to determine your overall percentage are listed below with their respective weights.

- Exams (40%)
- Homework/Quizzes (20%)
- Investigations and Group Project (30%)
- Final Project (10%)

Learning Outcomes

The **Mathematics Department** has identified the following learning outcomes to be achieved by majors and minors in its program.

1. Students will read and understand mathematics, differentiating between correct and incorrect mathematical reasoning.
2. Students will effectively communicate mathematics to others, both in writing and speaking.
3. Students will demonstrate abilities to work independently and in-groups to develop mathematical models using appropriate technologies.
4. Students will demonstrate mastery of the content of the course.

Academic Honesty:

The search for truth and dissemination of knowledge are the central missions of a university. Siena Heights University pursues these missions in an environment guided by our Roman Catholic tradition and our Dominican heritage. Integrity and honesty are therefore expected of all members of the University community, including students, faculty members, administration, and staff. Actions such as cheating, plagiarism, collusion, fabrication, forgery, falsification, destruction, multiple submission, solicitation, and misrepresentation, are violations of these expectations and constitute unacceptable behavior in the University community. The penalties for such actions range from verbal warning, all the way to expulsion from the University.

Students are responsible for their own work and accomplishments. You are encouraged to discuss problems with others, but the actual written work submitted should be your own. The first occurrence of cheating on any assignment will result in a grade of zero on that assignment. The second time the same student is observed cheating will result in that student being given an E for the course. All cases of academic dishonesty will be documented and reported to the appropriate authorities on campus. For a complete explanation of the Academic Dishonesty Policy, refer to page 169 of the SHU Undergraduate Catalog 2004-2006.

Students With Disabilities

Section 504 of the Rehabilitation Act of 1973 (Section 504), prohibits discrimination on the basis of physical or mental disability (29 U.S.C. Section 794). Siena Heights University is committed to furnishing appropriate auxiliary aids and services where necessary to afford any student with a disability an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity conducted by a public entity.

An academically qualified (has met admission standards) student with a disability who is in need of auxiliary aids/services is obligated to provide detailed documentation of the nature of the disabling condition to the Office of Disability Resources (303 Sacred Heart Hall/ 517 264-7683). The student will discuss with the coordinator of the ODR how the disability impacts performance in the academic setting. The student should initiate this process at the beginning of the semester, so that accommodations may be arranged before the student experiences difficulty. This process is not retroactive-a student may not disclose a disability in order to retake a failed test. Once appropriate accommodations/services have been determined, the student presents a Letter of Accommodation (provided after consultation with the coordinator of the ODR) to his/her course teaching staff and discusses a plan for implementing the accommodation/service.