Statistics and the Sports Industry

INQ 240-C2/ Fall 2025

Instructor: Adam Childers / childers@roanoke.edu

Office: Trexler 270G

Phone: 540-375-2449

Office Hours: 11:00AM-12:00PM, Tuesday, Thursday, and by appointment.

Meeting Time: 9:40-10:40AM, Monday, Wednesday, Friday

Meeting Place: Trexler 374

Required Texts: OpenIntro Statistics Fourth Edition by David Diez, Mine Cetinkaya-Rundel, Christopher D Barr I would recommend buying a physical copy buy you can download the electronic copy for free! You can find the book using the URL: https://www.openintro.org/stat/textbook.php . You are also required to have access to the open access grammar and style guide *Writing Guide with Handbook - Open Textbook Library*.

Labs: We will have serval labs throughout the semester that will focus on learning statistical computing. The labs will be completed in Minitab. You can access the software as a web application using your Roanoke College login through the following URL: https://app.minitab.com.

Course Objective: The objective of this course is to explore probability and statistics through the sports industry. The focus of this course will be asking questions and then developing the statistical techniques necessary to answer those questions. Using probability theory and statistical techniques, we will determine how to summarize, analyze, and communicate key features of a data set. We will understand the leading role that statistical analysis plays in the sports industry through quality assessment, team management, and safety issues.

Learning Outcomes:

1. Students will be able to use the methodologies of statistics to
    a. Investigate a topic of interest and make decisions based on the results.
    b. Design and carry out a simple statistical experiment.
    c. Critique news stories and journal articles that include statistical information. In the critique students will recognize variability and its consequences, identify potential sources of bias and both proper and improper cause and effect inference.
2. Students will be able to articulate the importance and limitations of using data and statistical methods in decision making.
3. Students will be able to write about course topics clearly and effectively.
4. Students will be able to interpret quantitative information related to the course topic.

Course Topics:

- Sampling Methods
- The Design of Experiments
- Descriptive Statistics
- Graphical Methods

- Estimation
- The Central Limit Theorem
- Elementary Probability
- Test of Hypothesis (z-tests, t-tests and Chi-square test)
- Confidence Intervals
- Analysis of Variance
- Correlation and Regression

Homework: We will have daily HW on www.myopenmath.com. Each day, there will be homework due for the following class. Register at myopenmath to set up an account. Course ID: **294143**. Enrollment key: RCINQ

Additional homework problems will be posted on Inquire for practice and there will also be written assignments focused on interpreting statistical content from news outlets.

Quizzes and Tests: There will be a quiz or test most weeks during the semester. Both will assess students understanding of material covered in class, take home readings, and homework assignments.

The four tests will be on:

Wednesday, September 17th
Friday, October 10th
Friday, November 7th
Wednesday, December 3th

Assignments and Projects:

Minitab Assignments: Throughout the semester we will be completing labs to understand how to use technology to visualize, organize, and analyze sports data.

Project: The final project will be a collaborative group assignment in which you will investigate a sports-related topic using both **descriptive** and **inferential** statistical methods. Your group will be responsible for selecting a topic, gathering or obtaining relevant data, performing a statistical analysis, and presenting your findings in a **formal written report**.

Final Exam: The final exam will be cumulative and will be Wednesday, December 10th from 8:30-11:30AM.

Grading: Grades will be assigned based on written assignments, quizzes, tests, and a final exam as follows,

Tests	45%
Homework/Quizzes/Labs	25%
Project	15%
Final Exam	15%

Grades will be determined based on the following:

A	> 93	B	83 – 86.9	C	73 – 76.9	D	63 – 66.9	A-	90 – 93	B-	80 – 82.9	C-	70 – 72.9	D-	60 – 62.9
B+	87 – 89.9	C+	77 – 79.9	D+	67 – 69.9	F	< 60								

Attendance: Class attendance is a very important aspect of a student's success in this course. The student is expected to attend every class and is accountable for missed content and assignments.

Missed Test: If you have to miss a test and have discussed it with me before the class takes the test, we can work together to re-schedule the test up to two days after the scheduled date. If it is not possible to take the test in that time period, I will replace that test grade with your final exam grade.

Make-up Work: No make-up work will be accepted. Any excused work will be replaced by the final exam. If an assignment is not turned in before the deadline and you have not contacted me about the assignment, it is considered unexcused.

Expected Hours of Work: This course expects you to spend at least 12 hours of work each week inside and outside of class.

Technology: Scientific calculators and the statistical programs Minitab will be used throughout the semester in the classroom and on assignments.

Academic Integrity System: Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! No electronic devices other than calculators can be taken out during any class or testing period (this includes cell phones) unless written consent is given by the professor. Note that looking at or using your cell phone during a test or quiz is considered a violation of Academic Integrity regardless of your purpose or intent in doing so. Since a central goal of this subject is to help you become independent and critical thinkers, you are discouraged from the extensive use of generative AI tools to create code or text as part of your work. If you do use AI-generated content in your assignments, you must clearly indicate what work is yours and what part is generated by the AI.

The Writing Center Roanoke College, located on the Lower Level of Fintel Library (Room 5), offers free tutorials focused on writing projects and oral presentations for students working in any field. Writers and presenters at all levels of competence may visit the Writing Center at any point in their process—including brainstorming, drafting, organizing, editing, or polishing presentation skills—to talk with trained peer tutors in informal, one-on-one sessions. The Writing Center is open Sunday through Thursday from 4 to 9 PM. Simply stop in, or schedule an appointment at www.roanoke.edu/writingcenter. Questions? Email writingcenter@roanoke.edu or call 540-375-4949.

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4-9 PM, Sunday-Thursday. Subject Tutors are highly trained, current students who offer free, one-on-one (and small group) tutorials in over 80 courses taught at Roanoke College, including: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Check out all available subjects and schedule 30- or 60-minute appointments at www.roanoke.edu/tutoring. If you have a question, feel free to stop by, or contact us at subject_tutoring@roanoke.edu or 540-375-2590. See you soon!

Accessible Education Services (AES) is located on the first floor of the **Bank Building**. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Dustin Persinger, Assistant Director of Academic Services for Accessible Education, at 540-375-2248 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester. The testing center, also located on the first floor of the Bank Building, can be reached at 540-375-2247.

Student Health & Counseling Services supports students through in-person health appointments, in-person counseling, 24/7 telehealth (TimelyCare), Therapy Assistance Online, as well as resources related to general wellness, LGBTQ+, sexual assault, substance abuse, and suicide prevention. Unmet health needs can negatively impact your performance in this course. Student Health & Counseling Services can help. Please see https://www.roanoke.edu/shcs for more information and to access services.