Probability and Statistics
STAT 202/ Spring 2018

Instructor: Adam Childers / childers@roanoke.edu

Office: Trexler 270G

Phone: 540-375-2449

Office Hours: 1:10-2:10 PM, Monday, Wednesday Friday,
10:00-11:00 AM, Thursday,
and by appointment.

Meeting Time: 12:00PM-1:00PM

Meeting Place: Miller 213

Required Text: *Mathematical Statistics with Application 7th Edition*, by Wackerly, Mendenhall, and Scheaffer.

Course Objective: The objective of this course is to apply calculus to the subject of probability in order to form a strong foundation for statistical methods. We will begin the course by discussing descriptive statistics and then move onto set theory and its application to discrete and continuous random variables. Armed with the tools of probability theory we will explore the relationship between probability theory and inferential statistics. We will finish the term by learning how to analyze data using statistical software to conduct hypothesis tests and create confidence intervals.

Intended Learning Outcomes: By the end of this course, students will be able to:

- understand and interpret a probability distribution.
- distinguish the difference between continuous and discrete random variables and understand how to use them to describe random processes.
- articulate the connections between probability theory and statistics using simulation.
- use precise mathematical language to describe random processes.
- understand the relationship between probability theory and games of chance.
- use descriptive statistics to explore the characteristics of a data set.
- perform tests of hypothesis and practically explain the results.

Content: We will cover most of the first 4 chapters in the text as well as an introduction to statistical inference. Included in these chapters is:

- An Introduction to Descriptive Statistics
- Probability
- Discrete Random Variables and Their Distributions
- Continuous Random Variables and Their Distributions
- Hypothesis Testing
- Confidence Intervals
- Correlation and Regression

Tests: There will be three tests during the semester. The will be given on:

- Friday February 9th
- Friday, March 16th
- Friday, April 13th

Problem Sets: A problem set will be due each Wednesday (excluding week 1) that we do not have a test. These will be assigned on the previous Wednesday and each are worth a total of 25 points each. There are two parts to each problem set. The first part is worth 10 points and will be graded based on effort and completeness. This part consists of the three daily homework assignments for the previous three class periods (assigned on Monday, Wednesday, and Friday). Daily homework will include roughly 3-6 questions and you are welcome to ask questions about them at the beginning of class.

The second part of each problem set is worth 15 points and will be graded based on correctness and presentation. Each week you will complete 3 problems which will be carefully graded. Each of these problems is worth 5 points, with 4 points for correctness and 1 point for presentation.

When you turn in your problem set on Wednesday, make sure the three problems graded for correctness are on top and then below are your three daily assignments. Your homework should be neat, organized, and stapled. No late homework will be accepted. For the first week we will have a single problem assigned on Wednesday, due Friday, to get you accustomed to the grading; it will be worth 10 points.

You can collaborate on problem sets but you must write up your own solution. If you are looking at another person's work when you are writing up your problem set, then you are in violation to the academic integrity policy of Roanoke College.

Labs: Throughout the semester we will be completing labs in Mathematica and R.

Final Exam: The final exam will be cumulative and will be given on Wednesday, April 25th, 8:30AM-11:30AM.

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

Tests	50%
Assignments/Quizzes/Labs	30%
Final Exam	20%

A *tentative* guideline for determination of grade will then be:

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

MCSP Conversation Series: Attending at least three MCSP conversation series event is required. Within one week of the lecture, a one page reflection paper will be due and will count for 10 points each in your homework total. Please upload them on Inquire.

Missed Test: I will not give make-up tests. If you miss a test and have discussed it with me before the class takes the test, I will use your final exam grade for replacement.

Make-up Work: No make-up work will be accepted. Any excused work will be replaced by the final exam.

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

Attendance: Attendance is required and expected and is crucial to be successful in this course. An absence that is not discussed with the instructor prior to class is considered unexcused. Regardless of whether the absence is excused or not, you are responsible for all the material covered in class.

Technology: Scientific calculators, Mathematica, R, Minitab will be used throughout the semester in the classroom and on assignments. Cell phones are expected to be turned off before entering the class and computers will be used in the classroom exclusively for academic purposes.

Academic Integrity System: The Roanoke College Academic Integrity System applies to all graded work in this course. Students are responsible for understanding and adhering to the Academic Integrity System. Among other things the Academic Integrity System prohibits giving or receiving unauthorized aid, assistance, or unfair advantage on academic work. Please note that having a phone or unauthorized electronic device out during a test is an academic integrity violation.

The Writing Center @ Roanoke College, located on the Lower Level of Fintel Library, offers writing tutorials focused on written and oral communication for students working on writing assignments/projects in any field. Writers at all levels of competence may visit the Writing Center at any point in their process, from brainstorming to drafting to editing, 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 by going to www.roanoke.edu/writingcenter, where our schedule of writing workshops and creative writing playshops is also posted. Questions? Email writingcenter@roanoke.edu or call 375-4949. Like our Facebook page for updates!

Subject Tutoring is an Internationally Certified Tutoring Center through the College Reading and Learning Association (CRLA). Our highly trained staff offers individual tutoring appointments for the following subjects: Business, Economics, Mathematics, Modern Languages, Lab Sciences & Social Sciences. Subject Tutoring is located on the lower level of Fintel Library in room 05 from 4-9 p.m. Sunday – Thursday. Students can logon to make an appointment at www.roanoke.edu/tutoring in 15, 30 or 45 minute intervals. For questions or concerns, please contact Shannon McNeal at 540-375-2247 or mcneal@roanoke.edu.

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in **Fintel Library**. 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 Dr. Sue Brown, Director of Academic Services and Acting Coordinator of Accessible Education Services, at 540-375-2247 or by e-mail at sbrown@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 Dr. Brown at your earliest convenience to schedule an appointment.