

# Mathematical Statistics

STAT 301/ Fall 2016

**Instructor:** Adam Childers / [childers@roanoke.edu](mailto:childers@roanoke.edu)

**Office:** Trexler 270G

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**Office Hours:** 10:50-11:50, Monday, Wednesday Friday,  
10:00-11:00AM, Thursday,  
and by appointment.

**Meeting Time:** 12:00-1:00 PM Monday, Wednesday, Friday

**Meeting Place:** 213 Miller Hall

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

**Course Objective:** The objective of this course is to expand our understanding of probability theory in order to clearly understand the role that it plays in statistics. We will investigate functions of random variables in order to define point estimators and understand their properties. While developing a strong understanding the theoretical aspects of statistical methods we will concurrently work on applied problems and handle real data sets.

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

- ...understand and interpret multivariate probability distributions.
- ...identify relationships between random variables.
- ...articulate the connections between probability theory and statistic.
- ...describe the role the central limit theorem plays in probability and statistics.
- ...understand the properties of point estimators and their connection with point estimates.

**Content:** We will cover most of chapters 5 through 9 in the text as well as parts of chapter 16. Included in these chapters is:

- Multivariate Probability Distributions
- Functions of Random Variables
- Sampling Distributions and the Central Limit Theorem
- Estimators
- Properties of Point Estimators and Methods of Estimation
- Bayesian Methods

**Tests:** There will be three tests during the semester. They will be on

- Friday, September 23<sup>rd</sup>
- Friday, October 28<sup>h</sup>
- Wednesday, December 2<sup>nd</sup>

**Homework/Assignments:** Homework will be assigned daily and graded for both completeness and correctness. Assignments will come from the book as well as projects using Mathematica, R, and Minitab.

**Quizzes:** We will have quizzes throughout the semester to help prepare for the tests.

**Final Exam:** The final exam will be cumulative and will be given on Friday, December 16<sup>th</sup> at 2PM.

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

|                        |     |
|------------------------|-----|
| Tests                  | 50% |
| HW/Assignments/Quizzes | 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 as a quiz grade.

**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](http://www.roanoke.edu/writingcenter), where our schedule of writing workshops and creative writing playshops is also posted. Questions? Email [writingcenter@roanoke.edu](mailto: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 log on to

make an appointment at [www.roanoke.edu/tutoring](http://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](mailto:mcneal@roanoke.edu).

**The Office of Disability Support Services (DSS)**, is located in the Goode-Pasfield Center for Learning and Teaching in **Fintel Library**. DSS provides reasonable accommodations to students with documented disabilities. To register for Disability Support Services, students must self-identify to the Office of Disability Support Services, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact JoAnn Stephens-Forrest, MSW, Coordinator of Disability Support Services, at 540-375-2247 or e-mail her at: [stephens@roanoke.edu](mailto:stephens@roanoke.edu) to schedule an appointment. If you have registered with DSS in the past, and would like to receive academic accommodations for this semester, please contact Ms. Stephens-Forrest at your earliest convenience, to schedule an appointment.