

STAT 3201: Introduction to Probability for Data Analytics

Autumn 2019 Course Syllabus

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Lectures: MWF 3:00-3:55 in Cunz Hall, Room 140

Office Hours: M 4:00-5:00, R 1:30-2:30 in Pomerene Hall, Room 161

Grader: Azriel Krongauz

Email Correspondence: Please begin subject with “STAT 3201.” In order to protect your privacy, all email correspondence must be conducted using a valid OSU name.# email account. Any email from a non-OSU account will be ignored.

I will attempt to answer emails within 48 hours; however, due to the large volume of emails this may not always be possible. Please consider whether the question has already been answered in the syllabus, the notes, or the textbook and whether your question would be best answered in person during office hours before sending an email.

Course Description: An introduction to probability and its role in statistical methods for data analytics. Equal emphasis is placed on analytical and simulation-based methods for quantifying uncertainty. Approaches to assessing the accuracy of simulation methods are discussed. Applications of probability and sampling to big-data settings are discussed.

After successful completion of this course, students will be able to:

- Quantify uncertainty about events using mathematical descriptions of probability
- Quantify uncertainty about events using simulation methods
- Assess the quality and accuracy of simulation-based descriptions of uncertainty
- Update a description of uncertainty based on new information
- Identify appropriate probability models for experiments/data and summarize expected outcomes from such models
- Use correlation and conditional expectation to describe the relationship between two random variables.
- Quantify uncertainty about summary statistics for large data sets

Course Prerequisites: MATH 1152, 1161.xx, 1172, 1181, or equivalent, or permission of instructor. Not open to students with credit for 4201 or Math 4530.

Course Materials: The required textbook for this course is *Mathematical Statistics with Applications* (7th edition) by Wackerly, Mendenhall and Sheaffer. A useful reference for R

programming is *Introduction to Probability and Statistics using R* by Kerns, available to download for free online at <https://github.com/gjkerns/IPSUR/blob/master/IPSUR.pdf>. This book provides many excellent exercises and examples which are directly related to the course material.

Computing: We will use the statistical package R, available for free online at <https://www.r-project.org/>. Many prefer to use the GUI provided by RStudio, available for free online at <https://www.rstudio.com/>. I will use RStudio for in-class demonstrations.

Grading Policy: Final course grades will be determined according to the following weights:

- **Homework** (20%) Homework will be assigned approximately biweekly. A hard copy will be due at the beginning of class on the date announced in class. You are encouraged to work together on homework problems, but each student must submit their own work, written in their own words. **Do not copy any part of another student's homework, including code.** Note that disseminating solutions or in any other way enabling other students to commit academic misconduct also constitutes academic misconduct and will be reported as such. Each student's lowest homework grade will be dropped at the end of the semester. Late homework will not be accepted.
- **Project** (10%) A final project will require use of R software and writeup of a typed report.
- **Exam 1** (20%)
- **Exam 2** (20%)
- **Final Exam** (30%)

A letter grade will be assigned based on the following rubric: A: 93-100, A-: 90-92.9, B+: 87-89.9, B: 83-86.9, B-: 80-82.9, C+: 77-79.9, C: 73-76.9, C-: 70-72.9, D+: 67-69.9, D: 63-66.9, D-: 60-62.9, E: below 60.

Exams: There will be three in-class exams which will cover material from lectures, homeworks, and assigned readings. Tentative dates for exams are given on the schedule uploaded to Carmen. Students will be permitted a calculator without CAS or the ability to access the internet or cellular networks and one 8.5" × 11" sheet of handwritten formulas (front and back).

Let me know as soon as possible if for some reason you must schedule a make-up exam so we can make appropriate arrangements. Any make-up exam must be taken within one week of the scheduled date. Exceptions to this policy will be made only in extreme situations such as serious injury or extreme illness requiring hospitalization.

Course Website: Important announcements, course materials, homework assignments, supplemental references, and other information will be posted on [Carmen](#).

Data Analytics Learning Center: Graduate teaching assistants (GTAs) for Stat 3201, 3202, 3301, 3302, 3303 and 4620 will hold their office hours in the Data Analytics Learning Center (DALC) in Pomerene 151. This is an excellent place to go to ask questions you might have regarding the course material, homework assignments, R, etc.

More information about the DALC, including GTA office hours, can be found here: <https://data-analytics.osu.edu/dalc>

Academic Misconduct

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University, or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Disability Services: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Mental Health Statement: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.

Note: This syllabus is a guide for the course and is subject to change with advance notice.