

STAT 3201: Introduction to Probability for Data Analytics

MWF 11:30 – 12:25

Pomerene Hall 250

The Ohio State University – Spring 2019

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Office Hours: MWF 10:30 to 11:15 or by appointment

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.

Textbook: *Mathematical Statistics with Applications*, 7th Edition, by Wackerly, Mendenhall, and Scheaffer

Topics: We will be covering parts of chapters 1 (Introduction and Summarizing Data), 2 (Probability), 3 (Discrete Random Variables and Their Distributions), 4 (Continuous Random Variables and Their Distributions), chapter 5 (Multivariate Probability Distributions), chapter 6 (Functions of Random Variables), 7 (Sampling Distributions).

Prerequisite: MATH 1152, 1161.xx, 1172, 1181, or equivalent, or permission of the instructor.

Website: The course website is carmen.osu.edu; please check it regularly. On the site you will find announcements, the syllabus, homework assignments, solutions, and grades (NOTE: The gradebook on Carmen is just that – a gradebook. It is used solely as a place to record your grade and the default Carmen overall grade will not be correct; as such, it should be ignored.)

Important Dates: The last day to drop a course is Friday, February 1st. The last day to withdraw from a course without petitioning is Friday, March 22nd. There will be no class Monday, January 21st (MLK Day), Monday, March 11th through Friday, March 15th (Spring Break).

Email Correspondence: In order to protect your privacy all email correspondence must be done through a valid OSU name.# account; any email from a non-osu.edu account will be ignored. Please make sure to include “STAT 3201” in the subject line. Note that the faculty and student (buckeyemail) email systems are completely separate. As an alum, I am in both and the latter will autocomplete my buckeyemail address; if you send an email to this address I will not receive it. Your best bet is to contact me through Carmen. In addition, I will not respond to questions which can be answered by looking at the syllabus or Carmen, by a quick search on osu.edu or Google, and/or were announced in class. Please allow up to 48 hours for responses to other inquiries made via email.

Extra Help: The Data Analytics Learning Center provides group tutoring in Pomerene Hall 151 beginning Monday, January 14th. More information can be found at <https://data-analytics.osu.edu/dalc>.

Evaluation:

Homework (5; equally weighted)	25%
Exam 1 (Wednesday, February 20 th)	20%
Exam 2 (Wednesday, April 3 rd)	20%
Project (Due Monday, April 22 nd)	10%
Final Exam (Friday, April 26 th 12:00 – 1:45)	25%

Homework due dates will be announced in class and on Carmen. There will be 5 homework assignments; each will have some problems graded for accuracy and some graded for completion. Homework is due at the beginning of lecture; late homework will not be accepted.

The dates for the exams are tentative and I reserve the right to change the dates of any and all assessments; at least one week of notice will be provided in case of a change. All homework assignments and in-class assessments must be completed in pencil. No makeup exams will be given. Please note that solutions, not answers, will be graded; a correct answer alone will not get full credit if the steps leading to it are not clear and/or correct. In addition, presentation/organization and correct use of terminology/notation will be assessed.

If you find a discrepancy in the grading of an assessment (e.g., incorrect addition/subtraction, correct answer marked incorrect, etc.) then you must bring it to my attention no later than one week from the day it is returned. After that no grade will be changed for any reason whatsoever.

The grading scale will be no harsher than the following scale:

A	A-	B+	B	B-	C+
[93,100]	[90,93)	[87,90)	[83,87)	[80,83)	[77,80)
C	C-	D+	D	E	
[73,77)	[70,73)	[67,70)	[60,67)	[0,60)	

Calculators: Please note that at no time will you be permitted to share a calculator with another student, use a calculator with a CAS, or use any internet enabled device (e.g., a cell phone) as a calculator.

Attendance: While I will not be taking attendance, you are expected to attend every class session. If you miss class then it is your responsibility to get any and all material covered from a classmate. Arriving late or leaving early is distracting to your classmates, and me and will not be tolerated.

Electronic devices: Use of communication devices and technology for activities other than class work disrupt the learning process for you and others in the class and will not be tolerated. Cell phones and other electronic devices should be turned off or silenced during class.

Recording of Class: Audio, video, and photographic recording of class content (e.g., lectures) is strictly prohibited without written authorization from the instructor. The transmission or dissemination of all course content onto public, commercial, or social media sites is strictly prohibited.

Computing: We will be using the R statistical computing software (available for free at www.r-project.org) along with the RStudio interface (available for free at www.rstudio.com). In addition, we will be using *Introduction to Probability and Statistics Using R* by Kerns (available for free at www.cran.r-project.org/we/packages/IPSUR/vignettes/IPSUR.pdf). Make sure you download R prior to downloading RStudio.

Academic Misconduct: Please help us to maintain an academic environment of mutual respect, fair treatment, and personal growth. You are expected to produce original and independent work for exams and homework. Although students are often encouraged to work together on homework assignments, all students must submit their own written work in their own words. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at <http://studentlife.osu.edu/csc/>.

Accommodation: 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. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. 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.

Final Comment: It is crucial that we have a mutual respect for one another as members of the OSU community and that we conduct ourselves accordingly. My responsibilities include coming to class prepared to teach you statistics, giving clear lectures, assigning carefully chosen homework problems that are relevant to our course, and carefully preparing exam questions that accurately measure your progress in the course. Additionally, I am responsible to be available to you outside of class for consultation in office hours and by appointment. Likewise, I expect you to come to class motivated to learn the material. This involves reading the material ahead of time, promptly starting the homework assignments, and seeking additional help before it is too late. Ultimately, you are responsible for your university education and what you take from it.

I reserve the right to change any and all items on this syllabus – any changes as well as official due dates and exam dates will be announced in class.

Tentative Schedule: (Items marked with “*” may be omitted)

Date	Lecture Topic	Textbook Reading
1/7	Course Introduction	1.1
1/9	Introduction to R	
1/11	Summarizing Data	1.2, 1.3
1/14	Summarizing Data	
1/16	Intro to Probability	2.1 – 2.4
1/18	Intro to Probability; Counting Methods	2.5, 2.6
1/21	No Class; MLK Day	
1/23	Counting Methods; Conditional Probability and Independence	2.7
1/25	Conditional Probability and Independence; Probability Laws	2.8
1/28	Probability Laws; Bayes’ Theorem	2.9, 2.10
1/30	Bayes’ Theorem; Discrete Random Variables	3.1, 3.2
2/1	Probability Distributions	
2/4	Probability Distributions; Expected Value and Variance	3.3
2/6	Expected Value and Variance	
2/8	Introduction to Simulation and Monte Carlo (MC) Simulation	
2/11	The Binomial Distribution Hypergeometric Distribution	3.4
2/13	The Geometric and Negative Binomial Distributions	3.5, 3.6
2/15	The Hypergeometric Distribution; The Poisson Distribution	3.7, 3.8
2/18	Review for Exam 1*	
2/20	Exam 1 (Chapters 1 – 3)	
2/22	Continuous Random Variables	4.1, 4.2
2/25	Expected Value of Continuous Random Var’s; The Uniform Dist.	4.3, 4.4
2/27	The Uniform and Normal Distributions	4.5
3/1	The Normal Distribution	
3/4	The Gamma and Exponential Distributions	4.6
3/6	The Gamma and Exponential Distributions; The Beta Dist.	4.7
3/8	The Beta Distribution	
3/18	Functions of Random Variables	6.1 – 6.3
3/20	Functions of Random Variables	6.4
3/22	Functions of Random Variables	
3/25	Functions of Random Variables; Sampling Distributions	7.1
3/27	Sampling Distributions	7.2
3/29	Sampling Distributions; The Central Limit Theorem	7.3
4/1	Review for Exam 2*	
4/3	Exam 2 (Chapters 4, 6, 7)	
4/5	Bivariate Probability Distributions	5.1, 5.2
4/8	Bivariate Probability Distributions; Project Introduction	
4/10	Marginal and Conditional Probability Distributions	5.3, 5.4, 5.5
4/12	Independent Random Variables; Conditional Expectation	5.11
4/15	Covariance and Correlation	5.7
4/17	Bivariate Normal Distribution	5.10
4/19	TBD	
4/22	Review for Final Exam*	
4/26	Comprehensive Final Exam 12:00 – 1:45	