

Department of Statistics and Actuarial Science
Probability & Statistics for Engineering & Physical Sciences (STAT:2020)

Spring 2021

STAT:2020:0AAA, 12:30-1:20 PM, MWF, virtual

STAT:2020:0BBB, 3:30-4:20 PM, MWF, virtual

<https://homepage.stat.uiowa.edu/~mbognar>

▷ **General Information**

- *Instructor:* Matt Bognar, 358 SH, 335-0799, matthew-bognar@uiowa.edu
- *Virtual Office Hours:* 11:00-12:30 Wednesday, 1:30-3:00 Thursday, and by appointment – use Zoom link on webpage
- *DEO:* Kung-Sik Chan, 241 SH, 335-0712
- *Textbook:* Montgomery and Runger (2018, e-book). *Applied Statistics and Probability for Engineers (7th edition)*, Wiley. *The UI Bookstore will automatically charge your UBill for this e-book. If you already have access to the 7th edition, be sure to opt-out to avoid the charge to your UBill (the UI Bookstore will email you details about opting-out).*
- *ICON/Web:* This course will use ICON (<https://icon.uiowa.edu>) for grades and our course website (<https://homepage.stat.uiowa.edu/~mbognar>) for announcements, homework assignments, etc.

▷ **Course Objectives**

- In this course we will cover the following topics (in roughly this order):
 - * Counting techniques, probability, conditional probability, Law of Total Probability, Bayes Theorem
 - * Random variables, expectation, variance
 - * Uniform, binomial, geometric, hypergeometric, negative binomial, Poisson, exponential, and normal distributions
 - * Sampling distributions, Central Limit Theorem
 - * Data collection, summary statistics, graphical displays
 - * Inference (confidence intervals and hypothesis testing) for a mean μ (Z and t)
 - * Inference for $\mu_1 - \mu_2$ (assuming equal variances)
 - * Inference for a proportion p (Wald and Agresti-Coull CIs, score test)
 - * Chi-square test for independence, chi-square goodness of fit test
 - * Inference for a population variance σ^2
 - * Propagation of error (Delta Method)
 - * Correlation and simple regression (including inference)
 - * One-way ANOVA
 - * Students will learn how to assess statistical significance for all inference procedures
- We will learn how to do some of the statistical analyses described in class using *Excel* as well as the sweet statistical software package *R*. *R* is available in the campus computer labs; it is also available for free at <https://www.r-project.org>. Hand computation will be stressed, however.
- We will *not* cover all parts of each chapter listed above. Focus your readings on the material that was covered in class. Supplementation to the textbook, when needed, will be provided.

▷ **Grading**

- *Exams:* There will be 2 midterms (17.5% each) and a final exam (25%). Exam dates:
 - * Exam 1: Tuesday, February 23, 6:30-8:30 PM, online
 - * Exam 2: Tuesday, April 6, 6:30-8:30 PM, online
 - * Final Exam: TBA

Students are expected to take the exams at the *scheduled time*. It is your responsibility to make the appropriate arrangements *beforehand*.

- *Quizzes:* (25% total) A quiz will be given during the official lecture time each Friday (except on the Fridays before the midterm exams). *Make-up quizzes will not be allowed under any circumstances.* The lowest three quiz scores will be dropped.
- *Homework:* (10% total) Homework is due each Friday and it will be submitted on ICON (part will be multiple choice, part will be open-answer). *Late homework will not be accepted under any circumstances.* The lowest three homework scores will be dropped.
- *Discussion:* (5% total) Your TA will take attendance in discussion. This constitutes 5% of your grade. No exceptions will be made for class conflicts, conferences, etc.
- Your attendance, participation, preparedness, work ethic, etc. may affect your final grade.
- This course uses the +/– grading system (i.e. grades such as A–, B+, and B will be assigned).
- **This course is not curved.** Grade cutoffs will follow the usual 90, 80, 70, 60 breakdown. Grades are not negotiated; they are assigned based upon your final course average. You may not raise your final grade by doing an extra project/work. This is not high-school.
- Final averages are rounded to 2 decimal places. As such, some students will just miss a grade cutoff. If you needed a higher grade, but just missed the grade cutoff, you should have worked harder. Don't ask to be moved higher.
- **It is your responsibility to have a calculator, tables, and pencils for the exams and quizzes.**
- Bonus points may be given at any time (such opportunities will only be available to the entire class, not on an individual basis). The bonus points may be applied to any part of your grade.
- *Statistics Tutorial Lab:* More information can be found at

<https://www.stat.uiowa.edu/resources/tutoring>

A list of private tutors can also be found here.

- The material in this course looks deceptively easy. It takes a significant time investment to excel at this material. Far too many students put this course at the bottom of their priority list and receive a poor grade. Invest yourself, be engaged.

▷ *Academic Misconduct*

- You must take quizzes and exams in isolation (nobody can be nearby) and you may not communicate with anyone. You may not use a computer, phone, or any device to access materials/software/people which would give you an unfair advantage on the quizzes and exams. A webcam is required during quizzes and exams for proctoring purposes.
- If you finish all homework problems in their entirety, you may then work with a fellow student to compare methods, answers etc. *Simply copying another student's homework will be considered academic misconduct.*
- All academic misconduct will receive the following sanctions:
 1. A report will be filed with the UI.
 2. You will receive a 0 on the exam/quiz/homework on which the academic misconduct took place.
 3. **Your final grade will be lowered by 2 full letter grades (e.g. from a B+ to a D+).**
- Students are encouraged to contact Matt (or your TA) about fellow students possibly engaging in academic misconduct. Your identity will remain totally anonymous.

▷ *The College of Liberal Arts and Sciences Policy and Procedures*

- *Absences and Attendance:* Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, including Holy Day obligations, military service obligations, unavoidable circumstances or University authorized activities. Students may use the CLAS absence form to aid communication with the instructor who will decide if the absence is excused or unexcused. The form is on ICON in the top banner under "Student Tools." More information is at <https://clas.uiowa.edu/students/handbook/attendance-absences>.

- *Academic Integrity:* All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College’s Code of Academic Honesty. Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through UI email. For information: (<https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code>).
- *Accommodations for Disabilities:* UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussing specific accommodations with the instructor. More information is at <https://sds.studentlife.uiowa.edu/>.
- *Administrative Home of the Course:* The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and related policies. Other colleges may have different policies. CLAS policies may be found here: <https://clas.uiowa.edu/students/handbook>.
- *Class Behavioral Expectations:* Students are expected to comply with University policies regarding appropriate classroom behavior as outlined in the Code of Student Life. This includes the policies and procedures that all students have agreed to regarding the Steps Forward for Fall 2020 in response to the COVID-19 pandemic. Particularly, all students are required to wear a face covering when in a UI building, including a classroom. In addition, the density of seats in classrooms has been reduced; in some instances, this will allow 6 feet or more between students while other cases, it may be less. Regardless, wearing a face covering and maintaining as much distance as possible are vital to slowing the spread of COVID-19. In the event that a student disrupts the classroom environment through their failure to comply with the reasonable directive of an instructor or the University, the instructor has the authority to ask that the student immediately leave the space for the remainder of the class period. Additionally, the instructor is asked to report the incident to the Office of Student Accountability for the possibility of additional follow-up. Students who need a temporary alternative learning arrangement related to COVID-19 expectations should contact Student Disability Services arrangements; 335-1462 (<https://sds.studentlife.uiowa.edu/fall-2020/covid-19-temporary-learning-arrangements/>).
- *Class Recordings: Privacy and Sharing:* Some sessions of a course could be recorded or live-streamed. Such a recording or streaming will only be available to students registered for the course. These recordings are the intellectual property of the faculty, and they may not be shared or reproduced without the explicit written consent of the faculty member. Students may not share these sessions with those not in the class; likewise, students may not upload recordings to any other online environment. Doing so is a breach of the Code of Student Conduct and, in some cases, a violation of the Federal Education Rights and Privacy Act (FERPA). Communication and the Required Use of UI Email Students are responsible for official correspondences sent to the UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2).
- *Complaints:* Students with a complaint about an academic issue should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to the College of Liberal Arts and Sciences; see this page for more information: <https://clas.uiowa.edu/students/handbook/student-rights-responsibilities>.
- *Final Examination Policies:* The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and location of a final exam. Students should not make travel plans until knowing this information. No exams of any kind are allowed the week before finals with very few exceptions made (for labs, ESL and some world language courses, and off-cycle courses): <https://registrar.uiowa.edu/final-examination-scheduling-policies>.
- *Nondiscrimination in the Classroom:* The University of Iowa is committed to making the classroom a respectful and inclusive space for people of all gender, sexual, racial, religious, and other identities. Toward this goal, students are invited in MyUI to optionally share the names and pronouns they would like their instructors and advisors to use to address them. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (<https://diversity.uiowa.edu/eod>).
- *Sexual Harassment:* Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see <https://osmrc.uiowa.edu/>.