

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

Spring 2022

STAT:2020:0AAA, 12:30-1:20 PM, MWF, 100 PH

STAT:2020:0BBB, 3:30-4:20 PM, MWF, W290 CB

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

▷ **General Information**

- *Instructor*: Matt Bognar, 358 SH, 335-0799, [matthew-bognar@uiowa.edu](mailto:matthew-bognar@uiowa.edu)
- *Office Hours*: 1:30-3:00 Thursday, 10:30-12:00 Friday, and by appointment
- *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  $\mu$  ( $Z$  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  $\sigma^2$
  - \* 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 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: Friday, February 25, in-class
  - \* Exam 2: Friday, April 8, in-class
  - \* Final Exam: TBA

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

- \* *It is your responsibility to bring a calculator, pencils, and statistical tables to the exams* – borrowing one of these items from your TA or Matt (should we have one available) will result in a 10 point (i.e. 10%) deduction for each item borrowed.
- \* If you must miss an exam, you must *directly* inform Matt *before* the exam begins. You will be required to provide full, detailed, irrefutable documentation.
- \* The exam key is released immediately after the exam. As such, we do not allow makeup exams after the official exam time.
- *Quizzes: (25% total)* A quiz will be given during lecture time each Friday (except on exam days). *Make-up quizzes will not be allowed under any circumstances.* The lowest two quiz scores will be dropped.
  - \* *It is your responsibility to bring a calculator, pencils, and statistical tables to the quizzes* – borrowing one of these items from your TA (should he/she have one available) will result in a 5 point (i.e. 25%) deduction for each item borrowed.
- *Homework: (10% total)* Homework is due in lecture each Friday. *Late homework will not be accepted under any circumstances.* The lowest two 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 illness, work conflicts, conferences, etc. You can miss 1 discussion without penalty.
- *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.

#### ▷ **Grading Notes**

- Grade cutoffs will be no higher than the usual 90%, 80%, 70%, 60% breakdown.
- Final grade cutoffs are not released.
- This course uses the +/- grading system (i.e. grades such as A–, B+, and B will be assigned).
- Your attendance, participation, preparedness, work ethic, etc. may slightly affect your grade.
- Final averages are computed to 2 decimal places.
- Your final grade is based solely on your performance in this class. Your final grade can not be negotiated. Scholarships, angry parents, academic standing, etc. are irrelevant to the grade you receive in this course.
- Matt reserves the right to give bonus points in lecture via unannounced quizzes, attendance, etc. Bonus points are not available on an individual basis.

#### ▷ **Academic Misconduct**

- During quizzes and exams, you may not talk, whisper, pass notes, view other students' work, allow a fellow student to view your own work (cover your paper), write-on (or read-from) the desktop, use class notes, etc. Also,
  1. Cell phones may not be used under any circumstances.
  2. Calculators may not be shared.
  3. Statistical tables may not be shared.
- 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*

- *Attendance and Classroom Expectations* College of Liberal Arts and Sciences Information for CLAS Undergraduates Fall 2021 Students are responsible for attending class and for knowing an instructor's attendance policies, which vary by course and content area. All students are expected to attend class and to contribute to its learning environment. Students are also expected to comply with University policies and directives regarding appropriate classroom behavior or other matters. Students also have the right to be evaluated solely on their academic achievement and the fulfillment of related requirements.
- *Absences* Students are responsible for communicating with instructors as soon they know that an absence might occur or as soon as possible in the case of an illness. Students may use the CLAS absence form to aid in communication with instructors who will decide if the absence is excused or unexcused; the form is located on ICON within the top banner under "Student Tools." Delays in communication could result in a forfeit of what otherwise might be an excused absence.
- *Absences: Illness, Unavoidable Circumstances, and University Sponsored Activities* Students who are ill, in an unavoidable circumstance affecting academic work, or who miss class because of a University sponsored activity are allowed by UI policy to make up a missed exam. Documentation is required by the instructor except in the case of a brief illness. Students are responsible for communicating with instructors as soon as the absence is known.
- *Absences: Holy Days* Reasonable accommodations are allowed for students whose religious holy days coincide with their classroom assignments, tests, and attendance if the student notifies the instructor in writing of any such religious Holy Day conflicts within the first days of the semester and no later than the third week. (See the University Operations Manual: <https://opsmanual.uiowa.edu/students/absences-class#8.2>).
- *Absences: Military Service Obligations* Students absent from class due to U.S. veteran or U.S. military service obligations (including military service-related medical appointments, military orders, and National Guard Service obligations) must be excused without penalty. Instructors must make reasonable accommodations to allow students to make-up exams or other work. Students must communicate with their instructors about the expected possibility of missing class as soon as possible. (For more information, see <https://opsmanual.uiowa.edu/students/absences-class/absences-military-service-obligations>).
- *Academic Misconduct* All undergraduates enrolled in courses offered by CLAS have in essence agreed to the College's Code of Academic Honesty. Academic misconduct affects a student's grade and is reported to the College which applies an additional sanction, such as suspension. Outcomes about misconduct are communicated through UI email (<https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code>).
- *Academic Accommodations for Students with Disabilities* UI is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as a mental health, attention, learning, vision, and a physical or health-related condition) through the Student Disability Services (SDS) office. The student is responsible for discussing specific accommodations with the instructor. Note that accommodations are not granted retroactively but from the time of the student's request to the instructor onward; additionally, accommodations must be requested at least two weeks in advance of the related assignment or exam (<https://sds.studentlife.uiowa.edu/>).
- *Class Recordings: Privacy and Sharing* Course lectures and discussions are sometimes recorded or live-streamed. These are only available to students registered for the course and the intellectual property of the faculty member. These materials may not be shared or reproduced without the explicit written consent of the instructors. Students may not share these recordings with those who are not enrolled in the course; likewise, students may not upload recordings to any other online environment. Doing so is a breach of the Code of Student Conduct and could be a violation of the Federal Education Rights and Privacy Act (FERPA); also see <https://dos.uiowa.edu/policies/code-of-student-life/>.
- *Communication: UI Email* Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community (Operations Manual, III.15.2). Emails should be respectful and brief, with complex matters addressed during the instructor's drop-in hours, for example. Faculty are not expected to answer email after business hours or during the weekends.
- *Communication: Free Expression* The University of Iowa supports and upholds the First Amendment protection of freedom of speech and the principle of academic freedom to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not

be penalized for the content or viewpoints of their speech if student expression in a class context is germane to the subject matter of the class and is conveyed in an appropriate manner. To learn more, visit <https://freespeech.uiowa.edu/>.

- *Complaints about Academic Matters* Students with a complaint about a grade or a related academic matter should first visit with the instructor and then with the course supervisor if one is assigned, and finally with the Chair of the department or program offering the course. Students may next bring the issue if not resolved to the College of Liberal Arts and Sciences. See <https://clas.uiowa.edu/students/handbook/student-rights-responsibilities>.
- *Final Examination Policies* The final exam schedule is published during the fifth week of the fall and spring semesters or on the first day of summer classes; students are responsible for knowing the date, time, and place of their final exams. Students should not make travel plans until knowing this information. A student with exams scheduled on the same day and time or who have more than two final exams on the same day should visit this page for how to resolve these problems by the given deadline: <https://registrar.uiowa.edu/makeup-final-examination-policies>. No exams are allowed the week before finals, but with some exceptions made for labs, language courses, and off-cycle courses (<https://registrar.uiowa.edu/final-examination-scheduling-policies>).
- *Home of the Course* The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the courses add and drop deadlines, the “second-grade only” option (SG0), and other undergraduate policies and procedures. Different UI colleges may have other policies or deadlines. See <https://clas.uiowa.edu/students/handbook>. Questions? Contact CLAS at [clasps@uiowa.edu](mailto:clasps@uiowa.edu) or 319-335-2633.
- *Mental Health* Students are encouraged to seek help as a preventive measure or if feeling stressed or overwhelmed. Students should talk to their instructors for guidance with specific class-related concerns and are encouraged to contact University Counseling Service (UCS) at 319-335-7294 during regular business hours to schedule an appointment. USC offers group and individual therapy as well as counseling for couples about relationships while making referrals to other resources (<https://counseling.uiowa.edu/>). Student Health can also address related concerns (<https://studenthealth.uiowa.edu/>). These visits are free to students. After hours, students are encouraged to call the Johnson County Community Crisis Line at (319) 351-0140 or dial 911 in an emergency.
- *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 based on race, class, gender, sexual orientation, national origin, and other identity categories indicated by the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity at <https://diversity.uiowa.edu/division/office-equal-opportunity-and-diversity-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 are expected to conduct themselves in a manner that maintains an environment free from sexual harassment and sexual misconduct. Those experiencing sexual harassment are strongly encouraged to report the incidents and to seek help (<https://osmrc.uiowa.edu/>).