Math 21: Introduction to Statistics

Instructor: Daniel Keliher
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Office Hours: TBD, on Zoom
Class Time: Problem Sessions TBD
Term: Summer Session II, 2020
Course Website: `https://canvas.tufts.edu/courses/20296`

Prerequisites: Comfort with high school algebra.

Course Description: We will cover descriptive data analysis, basic probabilistic and combinatorial reasoning, probability distributions, estimation, regression analysis, and hypothesis testing. At the end of the course, students will have an understanding of these topics and how to apply them. Students will also gain experience in communicating mathematics. *This course will essentially be run as a virtual flipped classroom*: You will watch video lectures created by the instructor, and then we will come together in groups to review and solve problems.

Textbooks: There is no official textbook for the course. Two sources that are good for supplementary reading are:

- *Introduction to Statistics* by David Lane, available for free at

  `http://onlinestatbook.com/2/index.html`

- *Learning Statistics with R* by Dan Navarro, available for free at

  `https://learningstatisticswithr.com`

I will also post the PDFs of each on the canvas site. I will post suggest readings from each as well.

Lectures: I have pre-recorded a number of short video lectures that introduce and practice various topics in statistics. I expect you to come to problem sessions having watched the relevant videos. During problem sessions, we will discuss the material and solve problems related to topics from the lectures in small groups.

Piazza: We'll have a class Piazza page where you can discuss problems, concepts, and homework exercises with your peers. I will also post extra, more challenging questions to the Piazza page. You will be expected to engage with the content posted there.

Assessment: Work for the course (and consequently the components of your final grade) will consist of the following:

- *Problem Sheets:* There will be a problem sheet every week with problems related to that week's lectures. The problems sheets will be released on Monday at 9am EST and will be due the following Monday at 10pm EST. **Late homework will not be accepted for any reason**, *but* your lowest two homework grades will be dropped from the final grade. Please talk to the instructor if there are extenuating circumstances impacting your ability to turn in the homework. You are welcome to collaborate with your peers on problem sheets, but you must turn in your own version written in you own words.
- *Section Quizzes:* Roughly every week, a quiz will be administered on Canvas to check comprehension of underlying ideas from a particular topic. These quizzes will be quick and emphasize understanding of the material, not long computations. They should be straightforward if you have kept up with the videos and problem sheets. Your lowest two quiz grades will be dropped from the final grade.
- *Exams:* There will be two exams, a mid-session exam and a final. These will be administered as take-home exams on canvas.
- *Participation:* Participation is a major component of your grade and is essential for understanding the material and solving the problems. You are expected to attend problem sessions and contribute to piazza. **I expect to see you actively participating in problem sessions or in office hours every week.** There will be ample opportunities to do this! That said, please be in touch with the instructor if you anticipate an issue that will impact your ability to participate.

Finally, one thing to keep in mind is that **math is hard!** The math community is pretty guilty of reinforcing the notion that some people are "math people" and the rest are not; this is not at all the case! You should expect to struggle at first with new mathematics, that feeling of struggling often goes hand-in-hand with learning and growth. Talking to me, your peers, and reserving time to really think about new concepts will go a long way towards understanding the material deeply.

Computational Aids: I don't care if you use a calculator on your homework or quizzes, though I will deliberately write questions that can be solved without them. The most important thing though is that you clearly write out what you're doing. Just writing down some number from a calculator will not get you any points.

Grading: Your final grade will be given by the following:

$$(0.25)(\text{Problem Sheets}) + (0.25)(\text{Participation}) + (0.2)(\text{Quizzes}) + (0.15)(\text{First Exam}) + (0.15)(\text{Second Exam})$$

I do not have predetermined grade cutoffs, but they will be set no higher than the following: A+ (98 and above), A (93-97), A-(90-92), B+ (87-89), B (83-86), B-(80-82), C+ (77-79), C (73-76), C-(70-72), D+ (67-69), D (63-66), D-(60-62), F (below 60). This means, for example, if you get an 85 in the class, your grade will be no lower than a B.

Office Hours: I will have two office hours every week (times TBA). You are welcome to speak to me at these times to ask me questions about lecture, homework problems, R questions, and topics from the course. Please remember though that *office hours are not a substitute for watching the lectures.*

Seriously, office hours are one of my favorite parts of teaching; I'll be delighted to talk to you about any aspect of the course provided you've already made a good faith effort to understand the material.

Class Environment: I am committed to creating a learning environment, though virtual, in which all students may learn comfortably and productively. Moreover, the class space we will all share should be an environment that respects a diversity of perspectives, experiences and identities. Please feel free to approach me regarding any issues impacting your experience in my class either in person, via email, or anonymously via this form: `https://forms.gle/GUN3qVPceBunn1m99`. If you prefer to speak to someone outside our class, you can approach the math department administration.

Student Accessibility Services: Tufts is committed to providing equal access and support to all qualified students through the provision of reasonable accommodations so that each student may fully participate in the Tufts experience. If you have a disability that requires reasonable accommodations, please contact the Student Accessibility Services office *at the beginning of the term* at *Accessibility@tufts.edu* or 617-627-4539 to make an appointment with an SAS representative to determine appropriate accommodations.

Online Tools: You will need access to the following:

- Zoom. Office hours and problem sessions will be conducted on Zoom. You can get zoom here `https://access.tufts.edu/zoom`.
- Canvas. Video lectures, quizzes, and homework assignments will all be posted and turned in here. `https://canvas.tufts.edu/courses/20296`.
- Piazza. We'll use a piazza forum to post extra questions and ask questions of each other. You can access our page/sign-up here `piazza.com/tufts/summer2020/math0021`. The access code for our class is *montyhall*.
- Feedback form. If there is some feedback you would rather remain anonymous, you can leave it here: `https://forms.gle/GUN3qVPceBunn1m99`.