STAT 211 – Statistical Principles I – Fall 2023

Instructor

	Office	Email	Office Hours
Darren Homrighausen	Blocker 450a	darrenho@tamu.edu[1]	Details on days/times on Canvas

Text[2]	*Probability and Statistics with R for Engineers and Scientists* Michael Akritas
Web Sites	Canvas
Prerequisites	MATH 152 or MATH 172 (this course will contain calculus)

This class seeks to provide a suite of tools for visualizing, exploring, and analyzing data.

Course Description:

Introduction to probability and probability distributions; sampling and descriptive measures; inference and hypothesis testing; linear regression; R statistical programming language

Learning Outcomes:

1. Identify appropriate graphs, summary statistics, and inferential statistics for real-world contexts
2. Interpret graphs and statistics in real-world contexts
3. Calculate summary and inferential statistics
4. Infer appropriate conclusions about populations based on data
5. Implement exploratory and inferential statistics in R

[1]Please put "STAT 211" and your section number at the beginning of the subject line. I may miss your email if it doesn't include this meta data.

[2]This book isn't directly referenced in the class in the sense of doing homework problems are assigned reading. However, the book is a great reference to augment/reinforce the lectures as well as give more insight into using R. If you come to me and say you are struggling, the first question will be "did you get the book?" Additionally, this book is used for STAT 212 as well.

Administrative Remarks

Lectures and Office Hours

Attendance. Classes will be lectured live and on campus during the scheduled days/times. I am planning on posting recordings of the lectures each day. Note that these recordings might not be high quality and there might be some technical issue affecting some or all of the recording.

Office Hours. My office hours will be held via Zoom. There are additional office hours and help sessions with the TAs. See the Canvas homepage for details and a schedule.

Software

R. In this class you will be provided the opportunity to work with the `R` statistical package. It is a free and widely used statistical computing platform. It is moderately well documented and has a vast user community (download it from `www.r-project.org`). This is the primary software for this class. We will discuss how to download and use R the first day of class.

A convenient interface for exploring `R` is `Rstudio`, which provides both an interpreter and an IDE. Some `R` resources:

- An Introduction to R
- Intro to R (video series by Google Developers)
- R studio (by RStudio)
- Simpliest introduction to R

Homework, Exams, Participation, and Grading Scheme

Homework.

- Due Fridays by 11:59 pm.
- Webassign:
  - **Important:** I am trying a new interface to Webassign this year. I've been assured that it will make the student experience much better. We have tested it as well as we can, but the true test will come as we all try it out this semester. Please bear with me if there are any issues, we will get it sorted out as soon as we can.
  - Go to Canvas → Modules → WebAssign Homework 1e Instant Access Generic → STAT 211
  - After clicking on that link, you should be taken to Webassign to get enrolled for the semester. If you have any problems, please look here first: `https://www.webassign.net/user_support/student/` or contact Cengage via: `https://www.cengage.com/coursepages/Live_Office`
  - "My Assignments" is the most important: this shows the homework assignments. They are due most weeks on Friday at 11:59 pm. If you are late you may extend the homework deadline by 1 day for a 10% penalty. (This is done through Webassign by clicking "request extension". Do not email the instructor). You may have three extensions per assignment for up to one week after the deadline. An extension without the penalty requires a University Excuse.
  - It is considered your responsibility to begin the homework early enough to manage computer problems, power outages, or content problems.
  - Each question can be submitted 5 times. If you have missed a question 3 times you should find help. There are TA's, and office hours as well as working with other students.
- We have found that students who work together tend to do better. Do not just guess.

Midterms. There will be two midterm exams. Midterms will be computerized, the software and format will be discussed later in the semester. They will be open book, notes, computer, calculator, ... You can use anything except: **no communicating in any way another person**

- Midterm 1 (Sept. 29, during class time). This will cover up to (and including) expected value (see class schedule below for a comprehensive list). There will be an in class review Sept. 27.
- Midterm 2 (Nov. 10, during class time). This will cover the materials from Joint distributions to Hypothesis testing for the mean. There will be an in class review Nov. 8.

If you have any issue with taking these exams on time, you must contact me at least one week before the exam.

Final. The final will be computerized, the software and format will be discussed later in the semester. The final is scheduled by the university based on the day/time of the class (see `https://aggie.tamu.edu/registration-and-records/classes/final-examination-schedules`). Here they are:

- **If you are in section 505:** Dec. 11 from 3:30 to 5:30 PM
- **If you are in section 506:** Dec. 8 from 10:30 to 12:30 PM

You must take the final at this time on this day. The final will be cumulative.

Participation. Every week, I will put up a simple quiz on Canvas. This will be due at the same time as the homework. In order to take the quiz, there will be a password. This password will appear during one of the lectures that week. There will be no extensions nor make-ups. I will drop your lowest score, however.

Grading Scheme. This course will follow the usual grading scheme of: A=90-100%, B=80-89%, etc. **Important:** Do not contact me near or at the end of semester asking for extra assignments or, worse, extra points in order to achieve a certain grade.

Homeworks	25%	due Fridays at 11:59 pm, no drops
Midterm 1	20%	During class time via Computer on Zoom
Midterm 2	20%	During class time via Computer on Zoom
Final	25%	
Participation	10%	Weekly quiz, need password, due Fridays at 11:59 pm, lowest dropped

Road to redemption. If you do poorly on a midterm, there is still hope. I will let you replace one of your midterm grades with your grade on the final exam (presuming your final exam grade is higher). Note that you **cannot** replace a zero on a midterm.

Cheating and Academic Dishonesty. It is considered cheating to get answers for questions on homeworks or exams from another student, online repository, or any other source. Examples of cheating: communicating in any way with any person other than the instructor during an exam, using homework solutions from a previous semester to answer questions, or copying someone else's answers on homeworks. Example of not cheating: working with other students and collaboratively coming up with answers to homework questions.

Note that with the recent push to move education online there has been a substantial increase in incidents of cheating. These violations continue to be punished severely and have had substantial repercussions for some students. You have all agreed to abide by the university honor code and hence your personal integrity is at stake as well as your academic future.

Covid-19 Announcement. To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.

Class Schedule

Class	Chapter(s)	Topics
Week 1	Chapters 0, 1	Introduction and R tutorial. Statistical concepts
Week 1	Chapters 0, 1	Statistical concepts
Week 2	Chapter 2	Introduction to probability
Week 3	Chapter 2	Conditional probability
Week 3	Chapter 2	Probability example
Week 4	Chapter 3	Discrete distributions
Week 5	Chapter 3	Continuous distributions
Week 5	Chapter 3	Expected value
Week 6		Review
Week 6		Midterm 1 (Sept. 29)
Week 7	Chapter 3	Moment generating functions
Week 7	Chapter 4	Joint distribution
Week 7	Chapter 4	Conditional distribution
Week 8	Chapter 4	Independence
Week 8	Chapter 4	Simple linear regression (SLR)
Week 8	Chapter 5	Sampling distributions
Week 9	Chapter 5	Central limit theorem
Week 9	Chapter 5	Bootstrap
Week 9	Chapter 7	Confidence intervals for the mean
Week 10	Chapter 7	Confidence Intervals for the Proportion
Week 10	Chapter 7	Confidence Intervals for SLR
Week 11	Chapter 8	Hypothesis testing for the mean
Week 12		Review
Week 12		Midterm 2 (Nov. 8)
Week 13	Chapter 8	Hypothesis testing for the proportion
Week 13	Chapter 8	Hypothesis testing for SLR
Week 13	Chapter 9	Comparing two means
Week 14	Chapter 9	Comparing two proportions
Week 14	Chapter 10	ANOVA
Week 14		Review (Dec. 4)

Important Topics

Attendance Policy. The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments. Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Make Up Work Policy. Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor. Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Disability Resources. Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit `disability.tamu.edu`. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Honor Code. "An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at `http://aggiehonor.tamu.edu`

Title IX and Statement on Limits to Confidentiality. Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident,

was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness. Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.