# STAT212: Principles of Statistics II
# 502 — Fall 2025

## INSTRUCTOR DETAILS

**Name:** Austin Brown
**Office:** Office 435, Blocker Building, 155 Ireland St
**Email:** austinbrown@tamu.edu
**Office Hours:** Tuesday 9:30AM–10:30AM and Thursday 9:30AM–10:30AM

## TEACHING ASSISTANT DETAILS

**Name:** Sara Antonijevic
**Email:** saraant@tamu.edu
**Recitation:** Wednesday 11:30AM–12:30PM
**Recitation Location:** In-person at Blocker Building 452A
**Office Hours:** Wednesday 2:50PM–3:50PM and Thursday 1:30PM–2:30PM
**Office Hours Location:** In-person at Blocker Building 409

## COURSE INFORMATION

**Course Number:** Principles of Statistics II
**Course Title:** STAT212
**Section:** 502
**Time:** Tuesday 8:00AM–9:15AM and Thursday 8:00AM–9:15AM
**Location:** Blocker Building Room 150
**Credit Hours:** 3

## COURSE DESCRIPTION

This is an *intermediate level* undergraduate course in statistical methods *intended mainly for students with a reasonable quantitative background and basic understanding/appreciation of statistics* and some familiarity with statistical softwares like R. It is meant to provide such students with a deeper understanding of standard statistical methods, including regression, analysis of variance, categorical data analysis etc., that are routinely needed in virtually any (quantitative) scientific discipline.

## COURSE LEARNING OUTCOMES

The **learning objectives** (broadly) are as follows.

- Students will learn the basic principles (in detail) of regression analysis, experimental design, analysis of variance, categorical data analysis, and nonparametric (or distribution-free) methods.
- Students will learn how to use the software R to perform various statistical analyses using these methods.
- Most importantly, students will gain an appreciation for the crucial role that statistics plays in helping us to *quantify and explain variability* (a.k.a. uncertainty or randomness) for *any* data driven problem!

## COURSE PREREQUISITES

Prerequisite is strictly enforced: STA211

## TEXTBOOK AND COURSE MATERIALS

**Course Content:** We have a common Canvas course page. All lecture slides, homework assignments, announcements and other course materials will be posted on this Canvas course. Further, any important announcements will also be posted in Canvas. Please make sure to check it regularly.

**Textbook**: The textbook is **required.** *Please ensure it is available to you by the second week.* The homework problems will often be from this book. All datasets used in the book are available online.

- Probability and Statistics with R for Engineers and Scientists by M. Akritas

  (Links to the TAMU Bookstore)

**Statistical Software:** We will be using the R statistical software for performing statistical analyses in this course including homework problems. R is a free software that can either be downloaded onto your personal computer. *Please ensure you can access and install* R *in your computer by the first week.* R is freely available online. Instructions on obtaining R are given at Canvas under 'R Help and Instructions', where you will also find useful links to manuals and tutorials on how to use R.

**Note Regarding** R**:** *You will be ultimately responsible* for: (a) ensuring you are comfortable with R and familiar with its basic usage, commands etc. (b) understanding all data analyses done via R throughout the course, including usage of all commands, packages etc., and (c) interpreting R output on exams.

## COURSE COMPONENTS

**Lectures:** Lectures will be conducted in person. Slides will be available on Canvas. Where possible, you are encouraged to bring a laptop or tablet to follow along.

**Lecture Slides:** will be *posted chapterwise (possibly with multiple subparts)* in Canvas and will be covered over multiple lectures. **Note:** I may sometimes update an existing set of notes for a chapter (or a subpart) by adding/editing some content later on. *Please check Canvas regularly and make sure that you have the most updated version.* Printed handouts of the slides will *not be provided in class.*

**Office Hours:** Instructor and TA's will hold office hours in-person to answer any questions related to the course. The office hour schedule will be posted on Canvas once finalized. It is recommended that you visit office hours whenever you have a question about the course.

**TA Recitation Sessions** *(optional)*: The TA will conduct a weekly 1-hour discussion session where they will review (as needed) the ongoing lecture notes and conduct problem solving and/or programming sessions related to (but **not** identical) to the homework problems (current or past). These sessions are meant to provide you with more assistance, help you complete the homeworks on your own and also prepare for the exams. You are free to ask your own questions as well here. But you are **not** allowed to simply ask the TA, directly or indirectly, to solve any current homework problem!

**Study Material:** Homework solutions and practice exams (and their solutions) will be made available on Canvas.

## GRADING POLICY

Each student's final grade will be computed according to the below grading scheme. No special rounding rules or individual grade adjustments (e.g. to meet GPA cut-offs, minimal requirements for programs, etc.) will be used to calculate course grades. No special reweighting of assessments or extra work will be accepted to account for perceived poor performance, nor to account for any assessment(s) that have been missed without accommodation. There are no exceptions to these policies.

**Please note the last day to drop the course without penalty.**

1. **Exams:** *two midterms and one final,* each of which will be in-class and multiple choice (bring scantron sheets). *Each midterm* will count **25%** of your grade, and the *final* will count **30%**. The exams will be cumulative and closed book. You may use formula sheets of your own making on each exam, but this is all besides pencils, a simple standard calculator that you will be allowed to use.

2. **Homeworks:** *Approximately 6-8 homework assignments* will be made over the course of the semester starting from the second week. These homeworks are required to be turned in for credit, and will comprise **20%** of your grade. All homeworks will have equal weightage. The **homework submissions must be made online via Canvas** (see instructions). Your solutions *must* be uploaded as a *single pdf file* with your name, course and email *clearly printed* on the first page.

| **Assessment** | **Grade** |
|---|---|
| Homework | 20% |
| Midterm test 1 | 25% |
| Midterm test 2 | 25% |
| Final exam | 30% |

Final grades are assigned according to the following standard Texas A&M grading scale:

- A 90-100
- B 80-89
- C 70-79
- D 60-69
- F 0-59

## COMMUNICATION

All questions about course materials should be addressed during office hours or during lecture. *Please use email only for administrative issues.* In all your emails to me and the TA, *please include the prefix "[STAT 212]" in your subject line headers* (or else, your email may go unanswered!).

## LATE WORK AND MISSED ASSESSMENT POLICIES

1. **Late Submission Policy:** No late submissions will be accepted throughout this course, unless you have an excused absence (as defined in Student Rule 7). You will be given a grade of 0 if you miss an assignment or exam due to an unexcused absence. If you are unable to take a test at the appointed time due to an excused absence (as defined in Student Rule 7), notify me *as soon as possible* so that a possible make-up exam can be scheduled at an appropriate time.

2. If you miss a class, it is *your responsibility* to catch up on any missed materials, class notes etc. and do so before you come to the next class. *After* you have done these, you may attend office hours if you still need further clarifications.

3. *Incompletes:* A temporary grade of Incomplete ('I') at the end of a semester indicates that the student has completed the course with the exception of a major quiz, final exam, or other work. *'I' will be given only* when the deficiency is *due to an excused absence* or other cause beyond the control of the student.

Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy (Student Rule 7).

## HOMEWORK POLICIES

- **Grading:** The assigned TA for this course will grade your homeworks online via Canvas. For some of the longer homeworks, they *may only grade a selected set of problems. Please be aware of this policy and make every effort to answer all questions.*

- Your **solutions must be your own work,** not from outside sources, consistent with the university rules on academic integrity (https://aggiehonor.tamu.edu). I expect you to follow this policy scrupulously. *Your chances for a good performance on the exams will likely be much higher if you follow this policy.*

    1. *You may use:* (a) all current course materials from this class; (b) any notes, homework, etc. from a related class that you took or are taking; (c) any discussion with the instructor or the TA; (d) any voluntary, mutual and cooperative discussion with other students currently taking the class.
    2. *You may* **not** *use:* (a) solution manuals (printed or electronic) or copies of pages from manuals; (b) solutions, notes, homework, etc. from previous classes or from students who took this class previously; (c) copying from students in this class, including expecting them to reveal their solutions in "discussion".
    3. While you are allowed to work/discuss with other students, you must ultimately produce your own work. Any *verbatim copying of homework solutions is absolutely forbidden* and constitutes a violation of the Honor Code. If detected, it will automatically lead to a grade of 0 regardless of who did the work.

## CLASSROOM POLICIES

Please be respectful with the use of mobile devices (phones/tablets/computers). If you need to answer a phone call, please exit the classroom for communication to avoid disrupting your peers.

## REGRADE REQUESTS

Regrade requests must provide a justification for where there exists a grading error and/or how the work meets the grading rubric. These justifications must further be backed up with concrete references to the course material. All regrade requests will be accepted no later than one week after the grade for that assessment is released. **The instructor/TA will re-grade the assessment in its entirety (i.e. grades can go up or down)** .

## ACCEPTABLE USES OF GENERATIVE ARTIFICIAL INTELLIGENCE

ChatGPT and other generative AI are freely available tools that can perform a variety of functions for us. However, it's important to understand how such tools are allowed to be used in this course. Acceptable uses of generative AI in this course include:

- Editing or rephrasing written work that has already been written by the student to improve the syntax, grammar and overall readability of the work.
- Synthesizing or explaining course concepts while learning and studying to contribute to their under- standing of the course material
- Looking up appropriate syntax of individual R functions for use in a data analysis or for understanding errors that may arise when running R code.

However, the work turned in by students must ultimately be their own and students will therefore be accountable for the work they turn in. Unacceptable uses of generative AI in this course include:

- Copying from any generative artificial intelligence applications, including ChatGPT and other AI writing and coding assistants, for the purpose of completing assignments in this course.
- Producing an entire data analysis, written report, or any other piece of work meant for grades.

In summary, generative AI like ChatGPT can be really helpful in your learning process and to improve skills valued in the workplace. However, it cannot be used as a substitute for learning and material produced from these tools should not be passed off as your own. This would be considered academic misconduct. The instructor therefore reserves the right to ask students to explain their work and their process for creating their assignment in an oral examination.

## INTELLECTUAL PROPERTY AND COPYRIGHT NOTICE

*All materials used in this course are copyrighted,* including, but not limited to, syllabi, lecture notes, homework assignments and solutions, exams, exam solutions, quizzes, review sheets, lab problems, additional problem sets, and any other in class or supplemental materials. Since these

are copyrighted, *students are not allowed to post, share or copy any materials created or used in the course, unless I expressly grant permission.*

Faculty members own copyright in their educational work at Texas A&M University, as stated in the Texas A&M University System Policy (http://policies.tamus.edu/17-01.pdf) for Intellectual Property Management and Commercialization. Any violation of this copyright policy could result in disciplinary actions, as stated in *Student Rule 20.2: Procedures in Scholastic Dishonesty Cases and Student Rule 20.1.2.3.1.* (Cheating: intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise. Unauthorized materials may include anything or anyone that gives a student assistance and has not been specifically approved in advance by the instructor.)

Texas A&M complies fully with the Digital Millennium Copyright Act ("DMCA"). Users of the Texas A&M network found to have engaged in repeated infringement of copyright are subject to termination of their network access and may be reported to the appropriate Dean or Human Resources officer for disciplinary action; see TAMU's Copyright Infringement Policies and Sanctions Notification for additional information. (https://security.tamu.edu/protectmyself/CopyrightInfringementPoliciesandSanctionsNotifications.php)

## STATEMENT ON PLAGIARISM

As commonly defined, plagiarism consists of passing off as one's own, ideas, words, writing, etc., which belong to another. In accordance with this definition, *you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person.* Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty".

## UNIVERSITY POLICIES

## 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.

## MAKEUP 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.)

## ACADEMIC INTEGRITY STATEMENT AND POLICY

"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 aggiehonor.tamu.edu.

## AMERICANS WITH DISABILITIES ACT (ADA) POLICY

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 the Disability Resources office on your campus (resources listed below) 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.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.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, a person who is subjected to the alleged conduct 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).

## 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 healthy self-care by utilizing available resources and services on your campus

Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or 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 988 Suicide & Crisis Lifeline (988) or 988lifeline.org.

## COURSE SCHEDULE

Below is a **tentative** schedule of exam dates and topics to be covered in class. The schedule is

subject to change and modification.

| Weeks | Topic |
|---|---|
| 1-5 | **Regression Analysis**<br>▪ *Topics covered:* Simple linear regression; More general regression (polynomial and non-polynomial regression); Multiple linear regression; Inference (hypothesis testing, confidence intervals, prediction etc.); Model selection; Implementations in R.<br>▪ Relevant sections of textbook: Chapters 12.1-12.3, 12.4.3-12.4.5. |
| **Midterm 1** | (Tentative) October 9 in-person during lecture time |
| 6-9 | **Analysis of Variance (ANOVA)**<br>▪ *Topics covered:* One-way ANOVA; Two-way ANOVA (with or without interaction); Multiple comparisons; Experimental designs – Completely Randomized Design and Randomized Block Design.<br>▪ Relevant sections of textbook: Chapters 10.1, 10.2.1, 10.3.1-10.3.2, 10.4.1-10.4.2, 10.4.4, 11.1-11.2. |
| 10-12 | **Analysis of Categorical Data**<br>▪ *Topics covered:* Binomial and Multinomial experiments; Chi-square goodness-of-fit test; Contingency tables (and related Chi-square tests).<br>▪ Relevant sections of textbook: Chapters 4.6.4, 10.2.3. |
| **Midterm 2** | (Tentative) November 13 in-person during lecture time |
| 13-14 | **Non-parametric Methods**<br>▪ *Topics covered:* Inference via distribution-free tests – sign test, signed-rank test and non-parametric ANOVA (Kruskal-Wallis test).<br>▪ Relevant sections of textbook: 8.3.5, 9.5.4, 10.2.2, 10.3.3. |
| **Final Exam** | December 12th, Friday, 1:00 p.m. – 3:00 p.m. |