STAT 344: Probability and Statistics for Engineers and Scientists I

Fall 2025

Instructor:	Ray Bai	**Time:**	TR 3:00 PM – 4:15 PM
Email:	rbai2@gmu.edu	**Place:**	Innovation Hall 105

Course Page:

https://canvas.gmu.edu/ (Check regularly for announcements and homework assignments)

Instructor Office Hours: Tuesdays and Thursdays 4:30-5:30 pm in Nguyen Engineering 1708 or by appointment

Teaching Assistant: Yu-Lin Hsu, yhsu7@gmu.edu

TA Office Hours: Mondays and Wednesdays 1:00-2:00 PM on Zoom: https://gmu.zoom.us/j/96554847425

Course Description: STAT 344 is an introduction to probability and statistics at the undergraduate level, with applications in computer science, engineering, operations research, and information technology. After a brief introduction and review of descriptive statistics, we will spend seven weeks on probability-related topics and seven weeks on basic statistical inference.

The tentative schedule of topics is:

- **Week 1**: introduction and descriptive statistics
- **Week 2-3**: probability
- **Week 4-5**: discrete random variables
- **Week 6-7**: continuous random variables
- **Week 8**: joint probability distributions
- **Week 9**: sampling distribution and Central Limit Theorem
- **Week 10-13**: statistical inference for a single sample
- **Week 14-15**: statistical inference for two samples

Learning Outcomes:

1. Be familiar with basic probability and commonly used probability distributions.
2. Understand the usefulness of the Central Limit Theorem and its applications.
3. Be able to conduct statistical inference for proportions, means, and differences between proportions or means using confidence intervals and hypothesis testing.

Prerequisites: MATH 114 or MATH 116 with grade of C or better.

Main References: We will use typed handouts prepared by the instructor. Parts of these lecture notes are *not* complete and will be filled in during lecture. The following textbook is **not required** but may be useful as an additional reference. **Exams will be based mainly on the class notes, not on the textbook.**

Montgomery, D. C. and Runger, G. C. (2018). *Applied Statistics and Probability for Engineers, 7th Edition.* Wiley.

Calculators: In-class exams **require** the use of a calculator (scientific **or** graphing). It is not necessary to own a graphing calculator.

Computing: We will use the software R for some examples in class and on the homework. You can download R for free from https://www.r-project.org/. The basics of R will be taught in class. No previous experience with R is required to take this class.

Homework: There will be 10 homework assignments, each worth 2% of the final grade. Students are allowed to discuss the problems and work together with their classmates, but each student must write up and submit their **own** solution. All homework will be submitted and returned electronically through Canvas.

Use of AI: Most of the assessments in this course (which account for 80% of your grade) are in-person where you will not be able to rely on AI. As a result, I will not be monitoring the use of AI outside of class. However, in order to get the most out of the homework and to best prepare for the exams, it is strongly recommended that you work through homework problems on your own. AI may be useful for clarifying points of confusion or for generating additional practice problems for the exams, but it is highly unlikely that you will perform well on the tests if you do not attempt to do the problems yourself.

Exams: There will be two in-class midterms and one final exam. The dates for the midterms are **Thursday, October 2** and **Tuesday, November 11**. The final exam is on **Thursday, December 11 from 1:30-4:15 pm**. Students may *not* take the final exam early, so please do *not* plan any travel for the holiday break prior to the final exam.

Grading: Your grade will be determined according to the following distribution:

- Homework: 20%
- Midterm with higher grade: 25%
- Midterm with lower grade: 15%
- Final Exam: 40%

The tentative grading scale is as follows: 90-100 = A, 80-89 = B, 70-79 = C, 60-69 = D, and 0-59 = F. Plus and minus grades will also be assigned but their point values will be determined after the final exam.

Accommodation: If you need special accommodations for examinations or any other aspects of the course, please contact me before or during the first week of the semester. Note that reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Disability Services by phone (703-993-2474) or e-mail ods@gmu.edu. All accommodations must be approved through the Office of Disability Services.

Academic Integrity: The GMU Honor Code pledge reads:

"To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University Community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set for this Honor Code: Student Members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work."

The *minimum* punishment for violations of the GMU Honor Code is a grade of zero for the work in question. In accordance with university policy, there may be other punishments, including an automatic F in the class and/or suspension or permanent dismissal from the university. Students should familiarize themselves with the full Honor Code at this link: https://academicstandards.gmu.edu/academic-standards-code/.