# The George Washington University
# Department of Statistics
# Probability
# STAT-8257
# Section 10

# Fall 2026

**Day:** Tuesday

**Meeting Time:** 6:10-8:40 p.m.

**Meeting Place:** Bell Hall 105


**Lecturer:** Hosam M. Mahmoud, Professor
**Email:** hosam@gwu.edu
**Office hours:** 3:00-4:00 Tuesday

**Grader:** Zixuan Zhao
**Email:** zixuan.zhao@gwu.edu


## Aim and Scope:

Rigorous modern measure-theoretic probability is introduced to provide a foundation for statistical inference. No prior knowledge of measure theory is assumed; the necessary concepts will be developed as necessary.

## Prerequisites:

A first course in probability is expected to be in your background. It is assumed that everyone already knows all the basic distributions (Discrete: Bernoulli, Binomial, uniform, Poisson, etc., and continuous: uniform, exponential, normal, gamma, beta, etc.). For example, I expect everyone to know how to **derive E**[$X$], the expectation of $X$, for $X$ say a binomial Bin($n$, $p$) random variable without the help of a book.

## Textbooks:

*Probability* by Alan Karr

Karr's book is a lucid coverage. We shall try to cover chapters 2 to 8. Still, you may find it helpful to keep at least one other text handy. Recommended texts are:

- Chung, K. (1974). *A Course in Probability Theory*. Academic Press, Orlando.
- Billingsley, P. (1995). *Probability and Measure*, 3rd Edition. Wiley, New York.
- Rosenthal, J. (2016). *A First look at Rigorous Probability Theory*, 2nd Edition. World Scientific, Hackensack, New Jersey.

Chung is terse, to the point and has challenging exercises. Billingsley is more verbose and makes it a point to alternate frequently between measure theory and probability concepts. Rosenthal was used in previous years as the assigned textbook.

## Learning outcomes:

As a result of completing this course, students will be able to:

1. Ask philosophical questions about probability theory and science.
2. Answer rigorous technical questions about probability.
3. Be at ease with several probabilistic modes of convergence.

## Grading Policy:

It is an integral part of the learning experience that you work out problems. Weekly assignments will be handed out before each class and will be graded before the following class. Late work will be penalized. Homework will constitute 35% of the grade. There are two types of problems in the homework: individual problems and group problems. You are, of course, expected to do an individual problem by yourself. The null hypothesis is to trust everyone. I shall always be glad to drop you a hint, if you ask for it.

There will be four quizzes of weight 5% each, a midterm examination of weight (20%), and final examination (of weight 30%). Note that these percentage points add up to 105%!

Here is an example of what constitutes an A grade in this class. You score 95% or above: All homeworks are solid and well done. You get above 85% in the Final Examination. You can miss a couple of problems here and there and still get an A.

## Blackboard:

Please check Blackboard frequently (at least twice a week), for there will be announcements and material passed through it.

## Workload:

It is expected that the student will spend about 5-6 hours a week studying and preparing for the class. This time may be evenly split between writing solutions to homework problems and reading in the textbooks.

## Academic Integrity:

I support the GW Code of Academic Integrity. It states: "Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information." For the remainder of the code, see:

http://www.gwu.edu/~ntegrity/code.html

Any case of the slightest hint of cheating will be prosecuted to the fullest extent of the university Academic Integrity Policy. You will receive an automatic F, and the case will be taken to the proper administrative channels.

## Support for students outside the classroom:

*DISABILITY SUPPORT SERVICES (DSS)*

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to:

http://gwired.gwu.edu/dss/

*UNIVERSITY COUNSELING CENTER (UCC)* ***202-994-5300***

The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:

- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals

See

**http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices**

## Security

In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.