

The George Washington University
Department of Statistics

STAT 4198-80/STAT 6289-80
SPRING 2026

STATISTICAL FINANCE

Classes: Wednesdays
Meeting Time: 6:10 PM.- 8:40 PM
Classroom: 1957 E Street Room 211
Instructor: Dr.Srinivasan Balaji

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Email: balaji@gwu.edu
Office hours: 4:00 PM-5:00PM on Mondays and Wednesdays and by appointment

Text: *An Elementary Introduction to Mathematical Finance* by Sheldon M. Ross, 7th Edition, Cengage Learning, 2008.

Supplementary Texts:

- 1) An introduction to Mathematical Finance with Applications by A.Petters and X.Dong, Springer Undergraduate Texts, 2016.
- 2) Statistical Finance by E.Lindstrom, H.Madsen, and J.N.Nielsen, CRC Press, 2015.
- 3) Financial Calculus by M.Baxter and A.Rennie, Cambridge University Press, 1996.
- 4) A course in Financial Calculus by A.Etheridge, Cambridge University Press, 2002.
- 5) Stochastic Calculus for Finance II – Continuous time models by S.Shreve, Springer, 2004.
- 6) Mathematics of Finance by M.Capinski and T.Zastawniak, Springer, 2nd Ed, 2011.

Scope: The course is an introduction to Statistical and Mathematical methods in Finance and will elaborate on the different techniques that come into play to analyze financial derivatives including various options. Several topics will be addressed. The class is cross listed for both STAT 6289 and STAT 4198. We will have both undergraduate students and graduate students in the class. The quizzes, homework assignments, and exams will be different for both groups. I will be covering additional materials for the graduate students with an additional hour of lecture every week. This lecture will be recorded and asynchronous Graduate students are expected to go over the material and they will be tested periodically. Will explain more in the class.

Prerequisites: An introductory course in Statistics and/or probability can be helpful, but is not required. Familiarity with integral and differential calculus is assumed. For example, I expect everyone in the class to know $\int x^6 dx$, $\int e^{-x} dx$, $\int \ln x dx$. Competence in basic algebra is expected, for example extraction of roots of equations of the second and third degree, and accurate manipulation of algebraic expressions are assumed to be in your background.

Topics: Basic probability and random variables, Financial Market preliminaries, Brownian motion, Interest rates and present value analysis, Annuities, Arbitrage theory, Risk Neutral Measures, Forwards, futures and Option Pricing, Black and Scholes Formula, and Derivatives pricing. . We will also cover some additional interesting topics, if time permits. Additional topics will be covered for graduate students such as martingale theory, Stochastic calculus, and pricing options using conditional expectations and martingales.

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

1. Use probabilistic methods in finance
2. Understand and apply pricing of various financial derivatives.
3. Have a global overview of the interplay between probability, statistics and finance.
4. Understand the interplay of martingale theory and conditional expectations in pricing (for graduate students)

Grading Policy:

Midterm 25% - Midterm Exam on Wednesday, March 4, 2026

Final 25% – Final Exam during the final exam week

Quizzes – 20%

Homework Assignments - 20%

Final Project – 10%

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 textbook.

Class Policy: Late work will not be accepted. No make-up exams.

Blackboard: Communication will be through blackboard. Will send an email after posting any new materials in the blackboard.

University Policies:

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: <https://studentconduct.gwu.edu/code-academic-integrity>

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 <https://healthcenter.gwu.edu/counseling-and-psychological-services>

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.