

## Math 530: Mathematics of Finance (Spring 2019)

**Professor:** Ryan Hynd ([rhynd@math.upenn.edu](mailto:rhynd@math.upenn.edu))

**Office:** 4N42 DRL

**Class schedule:** Tuesday and Thursday 10:30am–12:00pm

**Location:** DRL 4C8

**Office hours:** Wednesday 4:30–6pm

**Grader:** Matthew Klein ([mpwiener@sas.upenn.edu](mailto:mpwiener@sas.upenn.edu))

**Description:** The class is about mathematical modeling in finance. The core material will involve the Black–Scholes option pricing model. However, we will discuss additional topics, and you will write a paper based on another mathematical model in finance.

### **Black–Scholes theory topics**

The Binomial Model

Brownian motion and stochastic calculus

Risk neutral pricing for European options

Barrier options

Asian options

American options

**Textbooks:** Two books by Steven Shreve

“Stochastic Calculus for Finance I: The Binomial Asset Pricing Models” (Chapter 1-2)

“Stochastic Calculus for Finance II: Continuous-Time Models” (Chapters 1-8)

**Grading breakdown:** 50% for HW, 10% for a mid-term exam, 15% for a final exam, and 25% for a research paper. Having good attendance is a requirement for passing this course.

**HW:** An assignment will be due most weeks. You may work with your classmates, but you will need to write your solutions individually. Your lowest percentage HW grade will be dropped.

**Research paper:** Students will work together in groups of 3 and submit a research paper jointly. However, each student in a group will be responsible for writing one section of the paper. I will help to select groups, based on students’ interests, and I will help guide groups in choosing their research topics.

**Course deadlines and important dates:**

Midterm Exam: February 26

No class on February 28

Spring Break: March 4–8

A list of modeling topics you are interested in and your group, due March 14

Research proposal, due March 26

Research paper draft, due April 16

Research Paper due date: April 30

Final Exam: TBA