



蘇州大學
Soochow University

MAT 436 Financial Mathematics

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

This course introduces students to mathematical models used in pricing financial securities and managing risks. It covers mathematical finance, a subfield of probability theory developed for decision-making in uncertain financial markets. Topics include conditional expectation, martingales, stopping times, Snell envelope, interest rates, present value, discrete-time option pricing, multivariate normal distribution for Markowitz portfolio theory, Brownian motion, and the Black-Scholes formula for European options.

Upon Completion of this Course, students will be able to:

1. Communicate mathematical and/or statistical ideas to diverse audiences, both orally and in writing;
2. Understand the mathematical and numerical models used in pricing financial securities;
3. Analyze and evaluate risk estimates associated with financial instruments;
4. Demonstrate proficiency in discrete-time option pricing and portfolio optimization techniques;
5. Gain insight into the Black-Scholes model and its applications in financial derivatives pricing.

PREREQUISITES

STA 201 Statistics

GRADING



Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
2 Projects	20 Points
Midterm 1	15 Points
Midterm 2	15 Points
2 Reports	20 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Chris Ruckman, *Financial Mathematics: A Practical Guide For Actuaries And Other Business Professionals*, 2nd Edition, Bpp Professional Education, 2005.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Introduction to Financial Mathematics Topic 2: Time Value of Money: Present Value and Future Value Topic 3: Annuities and Perpetuities Topic 4: Yield Rates and Interest Rate Conversions Assessments: Project 1



Module 2	Topics: Topic 5: Bonds and Bond Pricing Topic 6: Cash Flow Analysis and Discounted Cash Flows Topic 7: Net Present Value (NPV) and Internal Rate of Return (IRR) Topic 8: Mortgage Mathematics and Amortization Assessments: Report 1
Module 3	Topics: Topic 9: Introduction to Financial Derivatives Topic 10: Option Pricing Models: Binomial and Black-Scholes Topic 11: Hedging Strategies and Risk Management Topic 12: Portfolio Theory and Asset Allocation Assessments: Midterm#1 Project 2
Module 4	Topics: Topic 13: Capital Asset Pricing Model (CAPM) Topic 14: Arbitrage Pricing Theory (APT) Topic 15: Fixed Income Securities and Interest Rate Risk Topic 16: Credit Risk Analysis and Credit Derivatives Assessments: Midterm#2 Report 2
Module 5	Topics: Topic 17: Financial Modeling Techniques Topic 18: Monte Carlo Simulation in Finance Topic 19: Valuation of Financial Instruments Topic 20: Regulatory Compliance and Financial Reporting Assessments: Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.



2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION



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Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.