

FIM 528 Course Syllabus

Options and Derivative Pricing

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INSTRUCTOR INFORMATION

Name	Office Phone	Email	Office Location
Andrew Papanicolaou	[###.###.####]	apapani@ncsu.edu	SAS, 3152

Virtual Office Hours

I will hold virtual office hours Tuesdays and Thursdays from 12PM to 1PM, on Zoom (email for a Zoom link).

Preferred Method of Communication

Outside of office hours the best way to reach me is through my NC State email (see email above).

Response Time

I generally will respond the same day, if not then the following morning.

COURSE INFORMATION

Course Website: <https://moodle-courses2122.wolfware.ncsu.edu/course/view.php?id=4907>

Meeting Time and Tool Used

Lectures are held T-Th 8:30-9:45AM, in 1216 SAS

Prerequisites/Corequisites

Basic probability

COURSE OVERVIEW

Catalog Description

The course covers (i) structure and operation of derivative markets, (ii) valuation of derivatives, (iii) hedging of derivatives, and (iv) applications of derivatives in areas of risk management and financial engineering. Models and pricing techniques include Black-Scholes model, binomial trees and PDE methods. Specific topics include simple no-arbitrage pricing relations for futures/forward contracts; put-call parity relationship; delta, gamma, and vega hedging; implied volatility and statistical properties; dynamic hedging strategies; interest-rate risk, pricing of fixed-income product; credit risk, pricing of defaultable securities. Wiener Process and Ito's Lemma will be introduced.

Structure

We meet 2 times per week for lectures. Homeworks will be assigned frequently (roughly every ~~other~~ week).

COURSE MATERIALS

Required Textbook and/or Software

Hull, John C., Options, Futures, & Other Derivatives, 10th edition, Pearson Education, 2014

(PDF available on Moodle)

Papanicolaou, A., *Introduction to Stochastic Differential Equations for Finance*, (2019)

<https://arxiv.org/pdf/1504.05309.pdf>

TECHNOLOGY REQUIREMENTS

Hardware

NC State's Online and Distance Education provides [technology requirements and recommendations](#) for computer hardware.

Software

It is essential for participants to be familiar with and be ready to use Moodle, Wolfware, Zoom and some form of PDF viewer.

Moodle and Wolfware is where all course resources are made available.

- > [Moodle and Wolfware](#)
 - o [Moodle Accessibility Statement](#)
 - o [Moodle Privacy Policy](#)
 - o [NCSU Privacy Policy](#)

A PDF viewer is required to view the course slides and assignments

- > [Adobe Reader](#) (for reading PDF files)
 - o [Accessibility Statement](#)
 - o [Adobe Privacy Policy](#)

Zoom is where office hours are conducted

- > [Zoom](#):
 - o [Zoom Accessibility Statement](#)
 - o [Zoom Privacy Policy](#)

A scanning device or camera that can take digital photos. This is for students who wish to turn there homework in electronically and are writing it by hand. For students taking pictures of their homeworks, a way to combine into a single document is to paste the picture file into a Microsoft Word document,

- > [Office 365](#)
 - o [Accessibility Statement](#)
 - o [Privacy Policy](#)

Additional resources

- > [DELTA's Netiquette or Best Practices for Teaching Online](#)
- > [Netiquette – Ethics in Computing](#)

GRADING

Grading Policy

Course grades will be calculated with the following weights:

- > 20 % - Homework Assignments.
- > 20 % - Midterm #1
- > 20 % - Midterm #2
- > 40 % - Final Exam

All students are expected to be present for exams. Exam dates are

Sept. 29 (midterm #1, online)

Nov. 3 (midterm #2, online)

Dec. 13 (final, in person) exam schedule: <https://studentservices.ncsu.edu/calendars/exam/#fall>

Job interviews are not a valid reason to miss any of these exam dates. I understand that the master's in finance is a professionally oriented program and students are actively pursuing career opportunities during their studies. However, it would be unfair for me to allow make-ups for reasons other than illness, religious observance, or anything other than the reason(s) considered valid by traditional university standards. Moreover, if a potential employer will not reschedule your interview to accommodate your school schedule, then I strongly suggest that you consider if you even want to work for this employer.

Grading Scale

Final course grade will be decided on a curve

COURSE SCHEDULE

Please note: course schedule is subject to change.

Week	Topic	Readings
Weeks 1 - 5	introduction, mechanics of trading, interest rates, forward and future prices, interest rate futures and swaps	Chapters 1-7
Week 6	midterm #1	
Weeks 6 - 10	properties of options, hedging and binomial trees, stochastic calculus, Black-Scholes-Merton model, extensions of Black-Scholes	Chapters 10-18
Week 11	midterm #2	

Weeks 12-15	the Greeks, implied volatility, numerics and Monte Carlo methods, exotic options	Chapters 19-21, 26
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COURSE POLICIES

Late Assignments

Late assignments will be accepted with 5 points taken off for every day submitted late. Assignments submitted after solutions have been posted will not be accepted.

Incomplete Grades

Incomplete grades will be considered on a case-by-case basis.

Attendance and Participation

There is no grade for attendance or participation in this class. Here is a link to NC State's Attendance Policy: <https://policies.ncsu.edu/regulation/reg-02-20-03-attendance-regulations/> and the Withdrawal Process: <https://studentservices.ncsu.edu/your-classes/withdrawal/process/>

UNIVERSITY POLICIES

Academic Integrity and Honesty

Students are required to comply with the university policy on academic integrity found in the [Code of Student Conduct](#). Therefore, students are required to uphold the university pledge of honor and exercise honesty in completing any assignment.

Please refer to the [Academic Integrity](#) web page for a detailed explanation of the University's policies on academic integrity and some of the common understandings related to those policies.

For use in courses with online exchanges among students and the instructor, but NOT persons outside the course:

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Students are responsible for reviewing the NC State University PRR's which pertains to their course rights and responsibilities:

- > [Equal Opportunity and Non-Discrimination Policy Statement](#) and [additional references](#)
- > [Code of Student Conduct](#)
- > [Grades and Grade Point Average](#)
- > [Credit-Only Courses](#)
- > [Audits](#)

Students with Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the [Disability Resource Office](#) at Holmes Hall, Suite 304, Campus Box 7509, 919-515-7653 . For more information on NC State's policy on working with students with disabilities, please see the [Academic Accommodations for Students with Disabilities Regulation \(REG02.20.01\)](#)

Trans-Inclusive Statement

In an effort to affirm and respect the identities of transgender students in the classroom and beyond, please contact me if you wish to be referred to using a name and/or pronouns other than what is listed in the student directory.

Basic Needs Security

Any student who faces challenges securing their food or housing or has other severe adverse experiences and believes this may affect their performance in the course is encouraged to notify the professor if you are comfortable in doing so. Alternatively, you can contact the Division of Academic and Student Affairs to learn more about the Pack Essentials program <https://dasa.ncsu.edu/pack-essentials/>

COURSE EVALUATIONS

ClassEval is the end-of-semester survey for students to evaluate instruction of all university classes. The current survey is administered online and includes 12 closed-ended questions and 3 open-ended questions. Deans, department heads, and instructors may add a limited number of their own questions to these 15 common-core questions.

Each semester students' responses are compiled into a ClassEval report for every instructor and class. Instructors use the evaluations to improve instruction and include them in their promotion and tenure dossiers, while department heads use them in annual reviews. The reports are included in instructors' personnel files and are considered confidential.

Online class evaluations will be available for students to complete during the last two weeks of the semester for full semester courses and the last week of shorter sessions. Students will receive an email directing them to a website to complete class evaluations. These become unavailable at 8am on the first day of finals.

- > Contact ClassEval Help Desk: classeval@ncsu.edu
- > [ClassEval website](#)
- > [More information about ClassEval](#)

SYLLABUS MODIFICATION STATEMENT

Our syllabus represents a flexible agreement. It outlines the topics we will cover and the order we will cover them in. Dates for assignments represent the earliest possible time they would be due. The pace of the class depends on student mastery and interests. Thus minor changes in the syllabus can occur if we need to slow down or speed up the pace of instruction.