

FINN 6210 / BPHD 8240: Financial Elements of Derivatives / Derivatives
Spring Semester, 2021

Professor: David C. Mauer
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Class: Tuesday 5:30-8:15 pm
Location: Zoom via Canvas
Office hours: by appointment (virtual via Zoom)
Course web page: <https://uncc.instructure.com/>

Course Description

This course examines derivatives, which are securities whose values derive from (or are contingent on) the price of an underlying asset. The specific types of derivative securities we examine include forward and futures contracts, swaps, and options. We will learn how to value these securities and how to use them for risk management purposes. A central theme in our discussion on valuation is that there should be no opportunities for riskless arbitrage in well-functioning markets. We will learn the mechanics of futures and options trading and implement trading strategies to mitigate various types of risk.

Learning Outcomes

Key concepts that students will learn in this course include:

- What are forward and futures contracts, and how are they used by market participants to hedge various types of price and/or quantity risks?
- How are futures prices determined, and what is the relation between futures prices and spot prices?
- How can firms use swaps to transform assets and liabilities from floating to fixed or from fixed to floating?
- How can individuals and firms use options to create alternative payoffs or to profit from any type of market environment?
- What are the important models to price options and how can we use these models to compute the Greeks?
- How can we use options and futures to hedge and alter the systematic risk of investment portfolios?

Class Expectations

- Please make every effort to arrive on time.
- Please keep an eye on your UNCC email, as I will communicate with you through it.
- Please visit the Canvas course website periodically to download course materials.
- Consistent class attendance is a strong predictor of academic success. If you earn an F or U grade, your last date of attendance will be reported. This may require you to pay back any financial aid money received for this course.

Online Classroom

- You are responsible for procuring reliable access to the internet for each of our class meetings.
- The schedule of *Zoom* virtual meetings is posted on Canvas, which is consistent with the course timetable in the **Course Outline** below. Please join the lecture by clicking the meeting link on *Canvas/Zoom*. Students are muted by default when they join the class. If you have any questions, please type them in the “chat” box, and I will address them accordingly.
- If you experience any technical difficulties, contact the IT Service Desk at 704-687-5500 or email the service desk at help@uncc.edu.
- Electronic video, image capture, and/or audio recording are not permitted during class, whether conducted in person or online, unless the student obtains permission from the instructor. If permission is granted, any distribution of the recording is prohibited. Students with specific electronic recording accommodations authorized by the Office of Disability Services do not require instructor permission; however, the instructor must be notified of any such accommodations prior to recording. Any distribution of such recordings is prohibited.

Course Materials

1. **Textbook (optional, not required):** John C. Hull, *Options, Futures, and Other Derivatives*, 2018 10th Edition. You may also want to pick up the solutions manual *Options, Futures, and Other Derivatives 10e: Solutions Manual*.

Note: The 2015 9th Edition of *Options, Futures, and Other Derivatives* is virtually identical to the 10th Edition and can be used instead of the 10th Edition.

2. **Lecture Notes:** Class lecture notes and supplemental notes will be posted on Canvas.
3. **Calculator:** You will need a calculator with the following functions: y^x , $1/x$, e^x , and \ln . A good business calculator (or a cheap scientific calculator) will have these functions.

Options Software

You will need a copy of the options software that is included with the Hull book. The 10th edition of the Hull book includes DerivaGem 4.00, which consists of two excel applications: *Options Calculator* and *Applications Builder*. You may download Deriva Gem 4.00 here <http://www-2.rotman.utoronto.ca/~hull/software/index.html>. We will use the *Options Calculator* later in the course.

Communication

The easiest way to contact me is via email. I frequently check my email and will always respond to your email. If I haven't responded, that means, for whatever reason, I did not receive it. Please continue to email me until you get a response.

I will contact you at your UNC Charlotte email address (@uncc.edu). If you respond to me with another email address, I will assume it is fine to respond back to you at that same email

address. When I email the entire class, however, I will only use your UNC Charlotte email address.

Problem Sets

There will be four problem sets this semester. The purpose of these problem sets is to provide you with applications of the material covered in the course. The first problem set involves the design of futures contracts. The second problem set covers futures, futures pricing, risk management strategies using futures contracts, and interest rate futures. The third problem set covers swaps and price restrictions on options. The fourth problem set covers option trading strategies, option pricing, and risk management strategies using options. These problem sets will count for 30 percent of your total course grade. The problem sets are due by 11:59 pm on the date that they are due (see **Course Outline**). Any problem set submitted after that time will be considered late. You will lose 25% of the grade for a problem set each day that it is late. ***You may work on problem sets in a group with no more than two (2) students. Each group will turn in only one problem set. You do not have to work with the same group for each problem set and you are not required to work in a group.***

Practice Questions

Lecture Note Questions: Each lecture note has a set of questions with answers. For example, the file *Lecture Note 1* has a corresponding question and answer file *Lecture Note 1 Questions*. The lecture notes and their corresponding question and answer files are posted on Canvas.

Practice Questions (optional): Each chapter in Hull concludes with Practice Questions. Answers to the Practice Questions are in the *Solutions Manual*.

Exams

There will be a midterm and final exam that cover class lectures, practice questions, and problem sets. The exams will be open-book and subject to a strict time limit. Additional details on exam policy will be provided as we approach the mid-term exam. However, note now that it is critically important that you be able to create an electronic version of your answers to exam questions (e.g., scan handwritten answers to a PDF file or combine multiple JPG images into a single PDF file). The final exam covers class material after the midterm (i.e., it is not cumulative).

Paper

Students taking BPHD 8240 have an additional paper requirement. Details on the paper will be separately communicated to these students.

Summary of Overall Grading

Item	% of Grade		Due Date
	FINN 6210	BPHD 8240	
Problem Sets	30	30	
Problem Set 1			February 16
Problem Set 2			March 9
Problem Set 3			April 13
Problem Set 4			May 4
Exams			
Midterm	35	25	March 16
Final	35	30	May 11
Paper		15	

Grading Scale

The grading scale for the course is as follows:

<u>Letter Grade</u>	<u>Wtd. Avg. %</u> *
A	≥ 90
B	[78, 89]
C	[68, 77]
U	≤ 67

* FINN Example: A student receiving 85%, 75%, 95%, and 100% on Problem Sets 1-4, and 75% and 85% on the midterm and final exams will have an overall weighted-average percentage of $(0.075)(85) + (0.075)(75) + (0.075)(95) + (0.075)(100) + (0.35)(75) + (0.35)(85) = 82.63\%$ and receive a letter grade of B.

College and University Policies

ACADEMIC INTEGRITY. All UNCC students have the responsibility to be familiar with and to observe the requirements of The UNCC Code of Student Academic Integrity (see the Catalog). This code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials (such as Library books on reserve), and complicity in academic dishonesty (helping others to violate the code). Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course. Students who violate the code can be punished to the extent of being permanently expelled from UNCC and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to U. If you do not have a copy of the code, you can obtain one from the Dean of Students Office. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the instructor who is responsible for dealing with them.

ATTENDANCE. Students are expected to attend all scheduled sessions in the courses for which they are registered and are responsible for completing the work from all of the class meetings. Absences from class may be excused by the instructor for such reasons as personal illness, religious holidays, participating as an authorized University representative in an out-of-town event, or unavoidable professional responsibilities that require missing a class. Whenever possible, students are expected to seek the permission of the instructor prior to absences.

DISENROLLMENT. At the discretion of the department offering a course, a student may be disenrolled from a course section if he or she does not attend the first scheduled meeting of the section. The department chair has the responsibility for providing timely notification to the student who is disenrolled.

COURSE WITHDRAWAL. Under the UNCC Course Withdrawal Policy, students may withdraw from a course until the withdrawal deadline and the mark of W will be assigned. No withdrawals will be permitted after the course withdrawal deadline. It is the student's responsibility to determine by the withdrawal deadline whether to withdraw from the course or stay in for a grade.

DIVERSITY. The Belk College of Business strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to, ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socioeconomic status.

UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office in Fretwell 230.

Policies Related to COVID-19 Protection

It is the policy of UNC Charlotte for the Spring 2021 semester that as a condition of on-campus enrollment, all students are required to engage in safe behaviors to avoid the spread of COVID-

19 in the 49er community. Such behaviors specifically include the requirement that all students properly wear [CDC-compliant face coverings](#) while in buildings including in classrooms and labs. Students are permitted to remove face coverings in classroom or lab settings only when I explicitly grant permission to do so (such as while asking a question, participating in class discussion, or giving a presentation) and while at an appropriate physical distance from others. Failure to comply with this policy in the classroom or lab may result in dismissal from the current class session. If the student refuses to leave the classroom or lab after being dismissed, the student may be referred to the Office of Student Conduct and Academic Integrity for charges under the [Code of Student Responsibility](#).

Students are expected to attend every class and remain in class for the duration of the session when it is safe to do so in accordance with university guidance regarding COVID-19. Failure to attend class or arriving late may impact your ability to achieve course objectives which could affect your course grade. An absence, excused or unexcused, does not relieve a student of any course requirement. Regular class attendance is a student's obligation, as is a responsibility for all the work of class meetings, including tests and written tasks. Any unexcused absence or excessive tardiness may result in a loss of participation points.

Students are encouraged to work directly with their instructors regarding their absence(s). For absences related to COVID-19, please adhere to the following:

- **Do not come to class if you are sick.** Please protect your health and the health of others by staying home. Contact your healthcare provider if you believe you are ill.
- **If you are sick:** If you test positive or are evaluated by a healthcare provider for [symptoms of COVID-19](#), [complete this form](#) to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary, and your instructors will be notified.
- **If you have been exposed** to COVID-19 positive individuals and/or have been notified to self-quarantine due to exposure, [complete this form](#) to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary, and your instructors will be notified.

To return to class after being absent due to a COVID-19 diagnosis or due to a period of self-quarantine, students should submit an [online request form](#) to Student Assistance and Support Services (SASS). Supporting documentation can be attached directly to the request form and should be from a student's health care provider or the Student Health Center, clearly indicating the dates of absences and the date the student is able to return to class. Instructors will be notified of such absences. If you are absent from class as a result of a COVID-19 diagnosis or quarantine, as instructor I will provide remote learning options and assignments on a case-by-case basis. The final decision for approval of all absences and missed work is determined by the instructor.

Course Outline

Except for the problem set due dates and the exam dates, all dates in the course schedule are approximate and may change depending on our pace through the material.

Dates	Topic
Jan 26	Introduction to Derivative Securities <ul style="list-style-type: none">• Lecture Note 1• Optional reading: Hull, Chapters 1 and 2
Feb 2	Pricing Forwards and Futures <ul style="list-style-type: none">• Lecture Note 2• Optional reading: Hull, Chapter 5
Feb 8-12	Break
Feb 16	Pricing Forwards and Futures (continued)
Feb 16	Problem Set 1 Due
Feb 23 and Mar 2	Futures Hedging Strategies <ul style="list-style-type: none">• Lecture Note 3• Optional reading: Hull, Chapter 3
Mar 9	Interest Rate Futures <ul style="list-style-type: none">• Lecture Note 4• Optional reading: Hull, Chapter 6
Mar 9	Problem Set 2 Due
Mar 16	Midterm Exam
Mar 23	Swaps <ul style="list-style-type: none">• Lecture Note 5• Optional reading: Hull, Chapter 7
Mar 30 and April 6	Option Specifications, Price Restrictions, and Early Exercise of American Options <ul style="list-style-type: none">• Lecture Note 6 and Supplemental Notes• Optional reading: Hull, Chapters 10 and 11
April 13	Option Trading Strategies <ul style="list-style-type: none">• Lecture Note 7 and Supplemental Notes• Optional reading: Hull, Chapter 12

April 13

Problem Set 3 Due

April 20

Binomial Trees and Risk Neutral Valuation

- Lecture Note 8 and Supplemental Notes
- Optional reading: Hull, Chapter 13

April 20 and April 27

Primer on Stochastic Calculus

- Lecture Note 9 and Supplemental Notes
- Optional reading: Hull, Chapters 14

May 4

Black-Scholes-Merton Option Pricing Model and the Greeks

- Lecture Note 10 and Supplemental Notes
- Optional reading: Hull Chapters 15 and 19

May 4

Problem Set 4 Due

May 11

Final Exam