CORNELL UNIVERSITY
Applied Economics & Management
Spring 2024
AEM 4210/6410
Futures, Options and Financial Derivatives,

Dr. Calum G Turvey
Office: 450A Warren Hall
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Course Page: CANVAS
Office Hours…Any Time… ***Open door policy***

- Class Location Statler Hall 265

Class Time Mon, Wed, 10:10am - 11:00am

- GraduateTA: Yunran Wang, yw2354@cornell.edu
  TA office hours TBA or by ZOOM

- This course is open to all undergradate students, but is most appropriate for Juniors and Seniors
- All graduate students from any discipline must register for AEM6410. AEM6410 meets with AEM4210 students but have an additional requirements to read papers and other aspects of futures and options of a more theoretical or applied nature. Graduate students registered in AEM6410 will receive messages from, and have readings etc posted to, the AEM4210 Blackboard page.

A. DESCRIPTION

Derivatives have traded for centuries. Although options have traded in the U.S. since 1790, the year 1973 marked the watershed in both the history of option pricing and trading with the development of Black-Scholes-Merton formula *(remember, folks won Nobel for this in 1997)* and the opening of Chicago Board Options Exchange (CBOE) respectively. Study of options and other derivative securities has since become one of the cornerstones of modern finance theory with enormous practical applicability. Derivatives make a whole set of risk management tools available to today's sophisticated investors and investment managers.

This course presents the modern theory of the derivative securities in a rigorous framework. We will cover forwards, futures, and options in detail. Although trading strategies are discussed in length, this course really focuses on hedging and derivatives with probabilities and risk being the starting point. Thus we have a great emphasis on Brownian motion and random walks, and other fundamental assumptions about futures and options including the mathematics leading up to the Black-Scholes proof.

This course will help you learn

a) To understand the meaning of markets and market risks (From Bitcon and tulips to efficient markets)
b) to price forwards and options ("pricing models")
c) and understand the fundamentals probabilities and dynamics describing asset risk
d) to develop and understand hedging and trading strategies with derivatives
e) how derivatives can be used to reallocate risk
f) to use derivatives for corporate risk management
g) how the financial crisis arose and how to prevent it
h) how to design and value financially engineered products including exotic options and weather derivatives

A knowledge of derivative securities will help you better understand risk management in today's financial markets and is expected to considerably enhance your marketability in many finance careers.

B. CLASSROOM DYNAMICS

I use a loose lecture style. What this means is that I accept questions of any type at any time in lecture and will answer with us much depth as is required. Students can question, debate, and argue any point at any time. Feel free to ask for clarification on any point.

C. PREREQUISITES

Prerequisite: AEM 2100 and AEM 3240 or equivalents. Recommended prequisite: ECON 3030 or AEM 2600/2601 or equivalent and a calculus course; familiarity with calculus and probability and statistics. Priority given to AEM students.

D. COURSE MATERIAL (REQUIRED)

1) Jarrow, Robert and Arkadev Chatterjea, 2013 or more recent, An Introduction to Derivative Securities, Financial Markets, and Risk Management, Norton Publishing.
2) Class Handouts and assignments are posted on CANVAS
3) Additional Readings will be posted on CANVAS

E. EXAMS AND GRADING (SUBJECT TO CHANGE)

Problem Sets	50%	
Midterm (Maybe)		25%
Final (Maybe)		25%
TOTAL	100%	

- There will be approximately 6 assignments throughout the semester. You will be given one week to complete the assignment.
- Each assignment is equally weighted
- Late assignments will be penalized by 50% of grade (unless waved by professor or TA)
- Late assignments will not be accepted beyond the end of the next class period (unless waved).

- All assignments will be submitted in pdf form through CANVAS portal
- There are no 'bell' adjustments to grades in the course: WYGIWYG (what you get is what you get). I do reserve the right to adjust grades upwards if I believe that I have been unfair or unreasonable in setting examinations.
- Attendance is mandatory. Because of large numbers of students studying remotely the course will be taped and made available as asynchrounous instruction.
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F. EXAM/ASSIGNMENT DATES

Assignments are generally equally spaced throughout the semester but specific timing depends on topic coverage and related issues.

G. GRADE RANGE PERCENTAGES

A+	97%-100%
A	93%-96.99%
A-	90%-92.99%
B+	85%-89.99%
B	75%-84.99%
B-	70%-74.99%
C+	67%-69.99%
C	63%-66.99%
C-	60%-62.99%
D	50%-59.99%
F	<50%

H. OUTLINE OF TOPICS ***(always tentative, the instructor can change order, add and delete and usually does)***

The course outline below is quite typical. The chapters are from the book but depending on edits to text book may change.
However, the class is quite dynamic and now and again I will introduce additional materials or ideas.

Topic 1 Forwards and Futures Markets
Topic 2 Pricing Forwards (and Futures) Contracts
Topic 3 Using Futures (and Forwards) Contracts

Special topics Futures prices and the Sino-USA trade war
Futures prices and the Russian-Ukrainian war
Carbon futures trading
Futures prices and COVID 19
Bitcoin futures and market structure
Reddit Rebels, short squeezes, and market efficiency and failure
Storage Economics and Super-Contango
Topic 4 Derivatives Trading & Risk Management
Topic 5 Basics of Derivatives & an Introduction to Financial Engineering

Topic 6	Brownian motion and the measurement of market risk
Topic 7	Options Trading Strategies
Topic 8	Arbitrage and Interest Rates- the Tools of Trade
Topic 9	Forwards and Futures Markets
Topic 10	Pricing Forwards (and Futures) Contracts
Topic 11	Using Futures (and Forwards) Contracts
Topic 12	Options Markets
Topic 13	Options Price Bounds
Topic 14	Binomial Option Pricing Model
Topic 15	The Black-Scholes-Merton Option Pricing Model
Topic 16	The Greeks

I. LEARNING GOALS

As an AACSB-accreditd business program, the Dyson School has the following set of Learning Goals with corresponding outcomes that are designed to be produced through successful completion of this course.

Develop effective communication skills	Students will complete a range of written summaries in the preparation of detailed assignments
Attain analytical and functional competency in basic business and economic skills	Students will gain experience processing a diverse set of assigned readings that utilize a wide array of spreadsheet-based methodological approaches, including simulation of Brownian motion and the Black-Scholes model. Students will be asked to critique various approaches to investigating hedging strategies in futures and options.
Demonstrate working knowledge of leadership principles and ability to apply to real world settings	The course routinely draws on contemporary, real-world settings to understand the range of issues facing financial systems in commodity and asset markets. This includes the application of first-principles and methods to issues that are current and evolving globally, for example trade wars, COVID 19, and digital markets.
Demonstrate ability to solve practical problems and make an impact in real world and society	Through course readings and presentations students will learn how to apply a variety of economic maodels and methods directed towards specific probems in futures and options
Develop skills to be critical consumers of business and economic information and research	Course readings do not follow any pre-defined notion of what an economic problem. Instead, students are taught how to identifiy an emerging problem and how to sift through a variety of analytical approaches to determine

	which is best used to evaluate the problem or issue at hand.