

MATH 4380-01, Section 14864

Updated on February 2, 2022

Mathematical Introduction to Options

Spring, 2022

Instructor:	Edward P. C. Kao	
Time:	MW 1:00 – 2:30 pm	
Class Venue:	SEC202	
Office:	629-PGH (713) 743-3456, website: www.math.uh.edu/~edkao ekao@uh.edu	
Grader/TA :	Thanh Hung Duong tduong21@cougarnet.uh.edu	
Course Objective:	The course is a mathematical introduction to options. We study the roles played by options, futures, forwards, and swaps in risk management. We introduce the notions of arbitrage, geometric Brownian motion, risk-neutral pricing, and martingales and the ways these concepts are used in pricing contingency claims.	
Grading Guide:	Homework	50%
	Final	50%
Final Exam:	2:00 am - 5:00 pm, Friday, May 6, 2022 (per UH Spring 2022 Final Exam Schedule)	
Recommended Text:	<i>Options, Futures, and Other Derivatives</i> , 10 th Edition, by John C. Hull, Prentice Hall, 2018.	
Homework:	Homework assignments will be emailed to you every one or two weeks. You need to email the answers produced under MATHEMATICA to the grader by the indicated due dates. Independent work is expected. It is important to use UH internet platforms (Office 365, cougarnet) to send and receive emails.	

Week	Dates	Topics	Chapters in Hull
1	1/19	Introduction	1, 2
2	1/24, 1/26	Futures, forwards, options, CAPM	3, 10
3	1/31, 2/2	Option markets and trading strategies	11, 12
4	2/7, 2/9	Binomial trees	13
5	2/14, 2/16	Wiener processes and Ito Lemma	14
6	2/21, 2/23	Black-Scholes-Merton Model	15
7	2/28, 3/2	Options on indices, futures	17, 18
8	3/7, 3/9	Binomial trees, Wiener processes	13, 14
9	3/14, 3/16	Spring Holidays, no classes	
10	3/21, 3/23	Greeks and volatility smiles	19, 20
11	3/28, 3/30	Volatility smiles	20
12	4/4, 4/6	Basic numerical procedure	21
13	4/11, 4/13	Martingale and measures	28
14	4/18	More on models and numerical methods	27
15	4/25, 4/27	Energy and commodity derivatives	35
16	5/2	Real options	36

UNIVERSITY OF HOUSTON SYLLABUS LANGUAGE: SPRING 2022

Required Language for Courses with a Face-to Face Component

Face Covering Policy

To reduce the spread of COVID-19, the University strongly encourages everyone (vaccinated or not) to wear face coverings indoors on campus including classrooms for both faculty and students.

Presence in Class

Your presence in class each session means that you:

- Are NOT exhibiting any [Coronavirus Symptoms](#) that makes you think that you may have COVID-19
- Have NOT tested positive or been diagnosed for COVID-19
- Have NOT knowingly been exposed to someone with COVID-19 or suspected/presumed COVID-19

If you are experiencing any COVID-19 symptoms that are not clearly related to a pre-existing medical condition, do not come to class. Please see [Student Protocols](#) for what to do if you experience symptoms and [Potential Exposure to Coronavirus](#) for what to do if you have potentially been exposed to COVID-19.

Consult the (select: [Undergraduate Excused Absence Policy](#) or [Graduate Excused Absence Policy](#)) for information regarding excused absences due to medical reasons.

Required Language for All Courses

COVID-19 Information

Students are encouraged to visit the University's [COVID-19](#) website for important information including on-campus testing, vaccines, diagnosis and symptom protocols, campus cleaning and safety practices, report forms, and positive cases on campus. Please check the website throughout the semester for updates.

Vaccinations

Data suggests that vaccination remains the best intervention for reliable protection against COVID-19. Students are asked to familiarize themselves with pertinent [vaccine information](#), consult with their health care provider. The University strongly encourages all students, faculty and staff to be vaccinated.

Reasonable Academic Adjustments/Auxiliary Aids

The University of Houston complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for disabled students. In accordance with Section 504 and ADA guidelines, UH strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please contact [the Justin Dart Jr. Student Accessibility Center](#) (formerly the Justin Dart, Jr. Center for Students with DisABILITIES).

Excused Absence Policy

Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston [Undergraduate Excused Absence Policy](#) and [Graduate Excused Absence](#)

Policy for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Under these policies, students with excused absences will be provided with an opportunity to make up any quiz, exam or other work that contributes to the course grade or a satisfactory alternative. Please read the full policy for details regarding reasons for excused absences, the approval process, and extended absences. Additional policies address absences related to military service, religious holy days, pregnancy and related conditions, and disability.

Recording of Class

Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the Justin Dart, Jr. Student Accessibility Center. If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with *anyone* without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.

Syllabus Changes

Due to the changing nature of the COVID-19 pandemic, please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible through (*specify how students will be notified of changes*).

Recommended Language

Resources for Online Learning

The University of Houston is committed to student success, and provides information to optimize the online learning experience through our PowerOn website. Please visit this website for a comprehensive set of resources, tools, and tips including: obtaining access to the internet, AccessUH, and Blackboard; requesting a laptop through the Laptop Loaner Program; using your smartphone as a webcam; and downloading Microsoft Office 365 at no cost. For questions or assistance contact UHOnline@uh.edu.

UH Email

Please check and use your CougarNet email for communications related to this course. To access this email, login to your Microsoft 365 account with your CougarNet credentials.

Webcams

Access to a webcam is required for students participating remotely in this course. Webcams must be turned on (*state when webcams are required to be on and the academic basis for requiring them to be on*). (Example: Webcams must be turned on during exams to ensure the academic integrity of exam administration.)

Honor Code Statement

Students may be asked to sign an honor code statement as part of their submission of any graded work including but not limited to projects, quizzes, and exams: “*I understand and agree to abide by the provisions in the (select: **University of Houston Undergraduate Academic Honesty Policy**, **University of Houston Graduate Academic Honesty Policy**). I understand that academic honesty is taken very seriously and, in the cases of violations, penalties may include suspension or expulsion from the University of Houston.*”

Helpful Information

Coogs Care: <https://www.uh.edu/dsaes/coogscare/>

Student Health Center: <https://www.uh.edu/healthcenter/>