HKUST BUSINESS SCHOOL 香港科大商學院
WORLD CLASS IN ASIA

Hong Kong University of Science and Technology
School of Business and Management

FINA 3203 Derivative Securities (L1/L2)
Spring 2021

1. GENERAL INFORMATION

Instructor:	Prof. Yan Ji, Assistant Professor, Department of Finance
Email:	jiy@ust.hk
Phone:	23588298
Office & office hours:	LSK 5005 Online office hour (right after class, or by email appointment)
Teaching Assistant:	Katy CHOI
Email:	katycck@ust.hk
Office & office hours:	LSK 5068 Online office hour (2:30-3:30PM Tuesday, 919-9165-5461 Passcode: 3203, or by email appointment)
Class Dates and Venue:	The classes will be taught online via Zoom until further notice. L1: Wed & Fri (15:00-16:20), online meeting ID: 935-0930-4769 (passcode: 3203) L2: Wed & Fri (16:30-17:50), online meeting ID: 996-0695-7993 (passcode: 3203)
Course Prerequisite(s):	FINA 2203 OR FINA 2303
Course Exclusion(s):	FINA 3203H Honors Derivative Securities
Course Add/drop deadline:	17-Feb-2021 (http://arr.ust.hk/reg/cr/cr_std_ug/regug_schedule.html) (Any late add/drop will not be considered, please contact your program office)
Canvas course site:	https://canvas.ust.hk/courses/

2. COURSE DESCRIPTION

This course covers one of the most exciting yet fundamental areas in finance: derivative securities. The global derivatives market is one of the most fast-growing markets, with over $600 trillion notional value in total. In the modern financial architecture, financial derivatives can be the most challenging and exotic securities traded by institutional specialists, while at the same time, they can also be the basic securities commonly traded by retail investors such as S&P 500 Index Options. Beyond trading, the basic ideas of financial derivatives serve as building blocks to understand a much broader class of financial problems, such as complex asset portfolios, strategic corporate decisions, and stages in venture capital investing. Therefore, It is as important as ever to understand both the strategic opportunities offered by these derivative instruments and the risks they imply.

We discuss a wide range of applications, including the use of derivatives in asset management, the valuation of corporate securities such as stocks and corporate bonds with embedded options, interest rate derivatives, credit derivatives, as well as crude oil derivatives. In addition to theoretical discussions, we also emphasize practical considerations of implementing strategies using derivatives as tools, especially when no-arbitrage conditions do not hold.

3. COURSE OBJECTIVES

The main objective of this course is to help students gain the intuitions and skills on (1) the pricing and hedging of derivative securities, and (2) using derivative securities for investment and risk management. In terms of methodologies, we apply the non-arbitrage principle and the law of one price to dynamic models through three different approaches: the binomial tree model, the Black-Scholes-Merton option pricing model, and the simulation-based risk neutral pricing approach.

4. COURSE INTENDED LEARNING OUTCOMES

On successful completion of this course, students are expected to be able to

Course Intended Learning Outcomes	Aligned Program Intended

	Learning Outcomes
CLO1: Understand the mechanics of the derivatives markets including futures, options, and swaps	P3, P4, P6, P8
CLO2: Use derivatives for hedging risks	P1, P3, P4
CLO3. Use derivatives for trading views on direction and volatility	P4, P8
CLO4. Price derivatives and understand how prices change with respect to different factors	P4, P7

5. COURSE TEACHING AND LEARNING ACTIVITIES

Course Teaching and Learning Activities	Expected contact hours	Study Load (% of study)
Lectures	37	27%
Assignments	18	13%
Mid-term Exam	2	1%
Final Exam	3	2%
Private Study Hour	80	57%
Total	140	100%

Assessment Methods	Brief Description (Problem sets due date and exam date)	Weight (%)	Aligned Course Learning Outcomes
Assignment 1	24-Feb, Wednesday	4	CILO2 to CILO4
Assignment 2	10-Mar, Wednesday	4	CILO2 to CILO4
Assignment 3	26-Mar, Friday	4	CILO2 to CILO4
Assignment 4	14-Apr, Wednesday	4	CILO2 to CILO4
Assignment 5	30-Apr, Friday	4	CILO2 to CILO4
Mid-term Exam	19:00-21:00, 22-Mar, Monday Venue: TBA	30	CILO2 to CILO4
Final Exam	TBA Venue: TBA	50	CILO2 to CILO4
	Total	100%	

6. STNDARDS FOR ASSESSMENT

Course Grade Descriptors

A+, A, A-	Excellent Performance
B+, B,	Good Performance
B-, C+, C	Marginal Performance
F	Failure

Assignments:

There are six problem sets. You only need to submit the first five problem sets. The last problem set is for your own practice. Please put down your session number (L1 or L2) clearly at the beginning of each submission. All submissions (electronic/scanned copies) should be made on CANVAS.

Each problem set is graded up to 10 points for timely submission, correctness of your derivations and solutions, and clarity of your explanations. Please do not be late for your problem set solution submission; otherwise, at least 4 points out of 10 will be deducted, and no submission is acceptable 24 hours after the corresponding deadline.

The graded assignments, grades, official solutions will be posted on CANVAS. Please talk to the TA if you feel there are any potential grading errors within two weeks of the problem set's due date.

Exams:

There are two exams: midterm and final. Both exams are based only on materials covered in lectures and problem sets. Both exams are closed-book and closed-notes. However, students can bring in an 8.5"-by-11" (A4-letter) cheat sheet. Cheat sheets must be turned in along with the exam papers. Calculators are allowed for both exams. The use of cell phones, touchpads, or laptops is not allowed during the exam.

Re-grading of the exam must be applied to all questions, if requested. No re-grading inquiries will be considered a week after solutions and grades are returned.
A make-up exam is offered for the midterm. Students must take the make-up exam on the same day (i.e. 22-Mar), but before the midterm exam time. Email requests should be sent to the instructor and TA by 18-Mar with specific reasons/proofs for not taking the normal midterm exam. Late requests will not be accepted.

Note: Details will be announced later in case we switch to online exams.

Attendance:
You are expected to attend the class to learn the course materials. However, the instructor or the TA will not take class attendance. The course materials are heavier compared to other courses in the business school. Regularly attending classes is important for learning the core materials of this course.

7. COURSE CONTENT AND TENTATIVE TEACHING SCHEDULE

Class	Date	Course Content	Reading (M)
1	3-Feb	Introduction to Derivative Securities	Ch 1
2	5-Feb	Forward Contracts on Financial Assets and Indices	Ch 3.1, 8.1-8.3
		Assignment 1 posted.	
	10-Feb	*No class (cancelled due to midterm exam on 22-Mar)*	
3	17-Feb	Future Contracts on Financial Assets and Indices	Ch 8.4-8.5
4	19-Feb	Forward Contracts on Commodities	Ch 7.1-7.3
5	24-Feb	Future Contracts on Commodities	Ch 7.4-7.8
		Assignment 1 due. Assignment 2 posted.	
6	26-Feb	Forward/Future Contracts on Currencies	Ch 8.6-8.7
7	3-Mar	Forward/Future Contracts on Interest Rate	Ch 9
8	5-Mar	Commodity Swaps	Ch 10.1-10.2
9	10-Mar	Interest Rate Swaps	Ch 10.3
		Assignment 2 due. Assignment 3 posted.	
10	12-Mar	Other Popular Swaps	Ch 10.4-10.6
11	17-Mar	Introduction to Options	Ch 12
12	19-Mar	Options Trading Strategies	Ch 4-5
	22-Mar	**Midterm exam at 19:00-21:00 for all sessions, Location TBA**	
13	24-Mar	Binomial Tree Models	Ch 13.1-13.2
14	26-Mar	Two-Step (and Multi-Step) Binomial Tree Models	Ch 13.3
		Assignment 3 due. Assignment 4 posted.	
15	7-Apr	Black-Scholes-Merton Formula	Ch 15.1-15.2
16	9-Apr	Dividends and Greeks	Ch 15.3-15.4
17	14-Apr	Delta-Gamma Hedging	Ch 16
18	16-Apr	Empirical Issues of the Black-Scholes-Merton Formula	Ch 15.5
		Assignment 4 due. Assignment 5 posted.	
19	21-Apr	American Options	Ch 12.3, 15.6
20	23-Apr	Exotic Options	Ch 17, 28
21	28-Apr	Default and Credit Risk	Ch 20.1, 32.1-32.3
22	30-Apr	Credit Derivatives	Ch 32.4-32.5
		Assignment 5 due. Assignment 6 posted.	
23	5-May	Theory vs. Reality: Failures of Non-Arbitrage Conditions	
24	7-May	Financial Innovation and Portfolio Risks	
	TBA	**Final exam TBA**	

TEACHING MATERIALS

Lecture notes are self-contained and will be posted on CANVAS (https://canvas.ust.hk/) before each class. I will not distribute hardcopies of lecture notes. All lectures will be video recorded. The TA will post the video links on CANVAS.

There are two versions of lecture notes. The longer version includes more materials and will be used for teaching. The shorter version only includes the materials that will be tested in midterm and final exams. Only the materials in the shorter version will be tested in exams.

Practice questions (with solutions) from textbook are posted on CANVAS. These questions are for you to better understand the course materials. However, if you already feel comfortable with the problem sets and lecture notes, there is no need to solve the practice questions for preparing the exams.

I will also post additional reading materials on CANVAS, including research papers and newspaper articles, which can provide useful background knowledge or add depth to the materials covered in lectures. These materials will not be tested in the exams. Readings and practice problems will be regularly assigned from textbook (M).

Suggested /supplementary Materials:
(M) McDonald, *Derivatives Markets*, 3rd ed., New International Edition, 2014, Pearson. (Note: it is fine to use the 2012 US edition, but chapter numbers are slightly different.)
(H) Hull, *Options, Futures and Other Derivatives*, 9th ed. (7th or 8th also works), Global Edition, 2015, Pearson.

Some Optional Materials:
(D) Das, *Traders, Guns & Money*, 3rd ed. Financial Times/Prentice Hall 2006.
(V) Veronesi, *Fixed Income Securities: Valuation, Risk, and Risk Management*, Wiley 2010.

MEANS/PROCESSES FOR STUDENT FEEDBACK ON COURSE

Complete online Student Feedback Questionnaires (SFQ) Survey during two weeks before the course end at: Canvas website (https://canvas.ust.hk) or SFQ Mobile website (http://sfq.ust.hk/mobile/) or HKUST iLearn app at smartphones / tablets.

COURSE POLICY

This course follows the standard policies in UG programs. Please refer to http://www.ust.hk/vpaao/integrity/ for HKUST rules regarding academic integrity.

All questions/requests should be sent to the instructor and TAs via email. Do not post your messages on CANVAS as we do not regularly check CANVAS comments.

ADDITIONAL COURSE INFORMATION