CUHK (SZ)
Course Outline

1. Course Identity

A. Course as listed in CUHK (SZ)

The information in this block should be exactly as approved by CUHK Senate. In case there are any differences, please explain in the table below.

Course code	MFE5130
Course title (English)	Financial Derivatives
Course title (Chinese)	
Units	3
Description (English)	This course is directed to those students who would like to acquire an introduction to the principles of pricing financial derivatives. The course starts with an introduction to the basic characteristics of options, futures, swaps and forward contracts. With the risk-neutral pricing theory, the binomial option pricing model and Black-Scholes-Merton pricing theory are then derived. In the advanced pricing theory, Itô's lemma and martingale pricing theory are presented systematically. Various exotic options are introduced at the end of the course.
Description (Chinese)	

B. Corresponding course in CUHK

Please give details of the *closest* corresponding course in CUHK (as approved by CUHK Senate and listed in course list). If the course in SZ maps to more than one course in CUHK, please make multiple copies of the block below.

Course code	
Course title (English)	
Course title (Chinese)	
Units	
Description (English)	
Description (Chinese)	

2. Prerequisites / Co-requisites
Please state prerequisites and co-requisites, in terms of courses in CUHK (SZ)* or any other requirements (e.g., having taken certain subjects in high school).

(* Because course codes may not yet be stable, please provide both course code and course tile.)

A. Prerequisites
Multivariable Calculus, Probability and Statistics.

B. Co-requisites

No co-requisite

3. Learning Outcomes

Upon completing the course, the student will be able to:
- understand the basic characteristics of options, futures and forward contracts.
- learn the principles and basic techniques in hedging the financial derivatives.
- understand the theory of risk-neutral pricing of financial derivatives.
- calculate the value of European and American options using the binomial model and the Black-Scholes option-pricing model.
- understand the basic concepts of stochastic calculus and its application in the pricing of financial derivatives.

4. Course syllabus
- Introduction to derivatives
- Introduction to forwards and options
- Trading strategies
- Forwards and futures
- Swaps
- Parity and other option relationships
- Binomial option pricing
- The Black-Scholes formula
- Market-making and delta-hedging
- Brownian motion and Ito's lemma
- Risk-neutral and martingale pricing
- Exotic options

5. Assessment Scheme

Component/ method	% weight
Class Participation	10%
Assignments	20%
Mid-Term Exam (2-hour Exam) **Date: 6-November-2019 (Wednesday)** **Time: 1:30pm to 3:30pm (in class)** **Venue: To be confirmed**	30%
Final Exam	40%

6. Grade descriptor

Grades	

A	- Demonstrate exceptional understanding of the course materials in assignments, project and final.
A-	- Demonstrate solid understanding of the course materials in assignments, project and final.
B	- Demonstrate substantial understanding of the course materials in assignments, project and final.
C	- Demonstrate fair understanding of the course materials in assignments, project and final.
D	- Demonstrate limited understanding of the course materials in assignments, project and final.
F	- Demonstrate unsatisfactory understanding of the course materials in assignments, project and final.

7. Feedback for evaluation

Formal Course and Teaching Evaluation
Informal feedback to instructor and/or teaching assistant
Departmental retreat and programme review

8. Reading

A. Required
"Derivatives Markets" 3rd edition, by Robert L. McDonald, Pearson Education Limited, 2013.

B. Recommended
- "Options, Futures, and Other Derivatives", 9th edition, by John Hull, Prentice Hall, 2015.
- "Mathematical Models of Financial Derivatives", 2nd edition, by Yue Kuen KWOK, Springer Verlag, 2008.
- "Stochastic Calculus for Finance I: The Binomial Asset Pricing Model", by Steven E. Shreve, Springer Verlag, 2004.
- "Stochastic Calculus for Finance II: Continuous-Time Models", by Steven E. Shreve, Springer(finance), 2004.

9. Course components

Activity	Hours/week
Lecture	3 hours per week

10. Indicative teaching plan

Week	Topic
1	Introduction to derivatives; Introduction to forwards and options
2	Trading strategies I
3	Trading strategies II; Forwards and futures
4	Forwards and futures; Swaps
5	Parity and other option relationships
6	Binomial option pricing I
7	Binomial option pricing II
8	The Black-Scholes formula I
9	The Black-Scholes formula II
10	Market-making and delta-hedging
11	Brownian motion and Ito's lemma
12	Risk-neutral and martingale pricing I
13	Risk-neutral and martingale pricing II
14	Exotic options

11. Implementation plan (2014–15)

The implementation plan may vary from year to year. Please indicate expected enrolment, and number of sections.

[Example: 150 students for lecture (x 2); 30 students for tutorials (x 10)]

12. Approval

Has the course title been included in the programme submission approved by CUHK Senate? Are there any differences?

Have the details (as in this document) been approved at School or other level in CUHK (SZ)?

13. Any other information

Honesty in Academic Work
The Chinese University of Hong Kong, Shenzhen places very high importance on honesty in academic work submitted by students, and adopts a policy of zero tolerance on cheating in examinations and plagiarism. Any related offence will lead to disciplinary action including termination of studies at the University (see http://www.cuhk.edu.cn/departsite/ar/en/Academic.html).

14. Version date

Version number	V4
As of (date)	20-July-2018