City University of Hong Kong
Course Syllabus

offered by Department of Economics and Finance
with effect from Semester A 2017/18

Part I   Course Overview

Course Title:	**Derivatives Pricing I: Stock and FX**
Course Code:	**EF4820**
Course Duration:	**One semester**
Credit Units:	**3**
Level:	**B4**
Proposed Area: *(for GE courses only)*	☐Arts and Humanities ☐Study of Societies, Social and Business Organisations ☐Science and Technology
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**EF3520 Stochastic Calculus for Finance AND** **EF4321 Derivatives and Risk Management**
Precursors: *(Course Code and Title)*	**Nil**
Equivalent Courses: *(Course Code and Title)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II   Course Details

1.   Abstract

This course aims to develop students' analytical and quantitative skills in the pricing of stock and currency derivatives. Key topics include fundamental pricing theory with different numeraires, Black-Scholes model, and numerical methods for PDEs, binomial models and Monte Carlo simulations. It also covers some advanced topics such as stochastic volatility and jump diffusion model. Students will be able to apply the quantitative methods to real life pricing and hedging stock and currency derivatives.

2.   Course Intended Learning Outcomes (CILOs)
(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Describe the idea of no-arbitrage pricing of options and fundamental asset pricing theorem		√	√	
2.	Analyse a variety of option pricing models, and apply the analytics to real market products			√	√
3.	Analyse the pricing of nonstandard features in exotic options, and design effective analytical and numerical solutions			√	√

* If weighting is assigned to CILOs, they should add up to 100%.   100%

 # Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1:   Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2:   Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3:   *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3.   Teaching and Learning Activities (TLAs)
(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
1	Class discussion	√	√	√	
2	Lectures	√	√	√	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting*	Remarks
	1	2	3		
Continuous Assessment: 50%					
Assignments	√	√	√	30%	
Projects	√	√	√	20%	
Examination: 50% (duration: 2 hours, if applicable)					
Examination	√	√	√	50%	
The weightings should add up to 100%.				100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Coursework and Examination		Demonstrate very strong knowledge in derivatives pricing, a superior grasp of the critical issue, and strong capability in making the connection with different pricing schemes.	Demonstrate good knowledge in derivatives pricing, a good grasp of the critical issue, and adequate capability in making the connection with different pricing schemes.	Demonstrate adequate knowledge in derivatives pricing, some knowledge of the critical issue, and sign of awareness of using different pricing schemes.	Demonstrate marginal knowledge in derivatives pricing, limited knowledge of the critical issue, and no awareness of using different pricing schemes.	Demonstrates very little knowledge in derivatives pricing, no awareness of the critical issue and the use of different pricing schemes.

Part III   Other Information (more details can be provided separately in the teaching plan)

1. **Keyword Syllabus**

   Fundamental Asset Pricing Theorem,
   Black-Scholes model and partial differential equation,The Greek letters,
   Numerical methods in derivatives pricing (Binomial, Monte Carlo, Finite Difference),
   Exotic options,
   Stochastic volatility and jump diffusion models

2. **Reading List**

2.1 **Compulsory Readings**
   (Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Kerry Back, A Course in Derivative Securities: Introduction to Theory and Computation, Springer (ISBN 978-3-540-27900-6)
2	John C. Hull, Options, Futures, and Other Derivatives, Prentice Hall (ISBN 0-13-046592-5)

2.2 **Additional Readings**
   (Additional references for students to learn to expand their knowledge about the subject.)

1.	P. Wilmott, Paul Wilmott Introduces Quantitative Finance, Wiley