EF4820: DERIVATIVES PRICING I: STOCK AND FX

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Derivatives Pricing I: Stock and FX

Subject Code
EF - Economics and Finance
Course Number
4820

Academic Unit
Economics and Finance (EF)

College/School
College of Business (CB)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
EF3520 Stochastic Calculus for Finance AND
EF4321 Derivatives and Risk Management

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

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.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the idea of no-arbitrage pricing of options and fundamental asset pricing theorem		x	x	
2	Analyse a variety of option pricing models, and apply the analytics to real market products			x	x
3	Analyse the pricing of nonstandard features in exotic options, and design effective analytical and numerical solutions			x	x

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 real-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.

Teaching and Learning Activities (TLAs)

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

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3	30	
2	Projects	1, 2, 3	20	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Assessment Rubrics (AR)

Assessment Task

Coursework and Examination

Excellent (A+, A, A-)

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.

Good (B+, B, B-)

Demonstrate good knowledge in derivatives pricing, a good grasp of the critical issue, and adequate capability in making the connection with different pricing schemes.

Fair (C+, C, C-)

Demonstrate adequate knowledge in derivatives pricing, some knowledge of the critical issue, and sign of awareness of using different pricing schemes.

Marginal (D)

Demonstrate marginal knowledge in derivatives pricing, limited knowledge of the critical issue, and no awareness of using different pricing schemes.

Failure (F)

Demonstrates very little knowledge in derivatives pricing, no awareness of the critical issue and the use of different pricing schemes.

Part III Other Information

Keyword Syllabus

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

Reading List

Compulsory Readings

	Title
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)

Additional Readings

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