

EF4820: DERIVATIVES PRICING I: STOCK AND FX

Effective Term

Semester A 2024/25

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.

Learning and Teaching Activities (LTAs)

LTAs	Brief Description		CILO No.	Hours/week (if applicable)
1	Class discussion	Students will engage in class discussions to enhance communication skills, critical thinking and develop creative and innovative abilities.	1, 2, 3	
2	Lectures	Students will engage in lecture and to think critically and logically by responding to questions and solving the problems.	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