

**COURSE DATA****Data Subject**

Code	42205
Name	Derivatives
Cycle	Master's degree
ECTS Credits	6.0
Academic year	2021 - 2022

Study (s)

Degree	Center	Acad. year	Period
2081 - M.U. Banca y Finanzas Cuantitativas (2007)	Faculty of Economics	1	Annual

Subject-matter

Degree	Subject-matter	Character
2081 - M.U. Banca y Finanzas Cuantitativas (2007)	1 - Compulsory subjects	Obligatory

Coordination

Name	Department
LUCIA LOPEZ, JULIO JESUS	113 - Financial and Actuarial Economics

SUMMARY

The main objective of this subject is to provide an in-depth introduction to derivative securities and markets. It provides coverage of the analytical techniques needed to understand how derivatives work, how they are used, and how they are priced.

PREVIOUS KNOWLEDGE**Relationship to other subjects of the same degree**

There are no specified enrollment restrictions with other subjects of the curriculum.



Other requirements

Relationships with other subjects:

This subject is related to the basic subjects "Foundations of Financial Economics I and II", as well as the instrumental subjects "Stochastic Processes" and "Numerical Calculus for Finance". Additionally, a successful completion of the "Derivatives" course is required to tackle the more advanced contents that are covered in the subject "Derivatives (Extension)".

OUTCOMES

LEARNING OUTCOMES

Students will acquire knowledge and diverse techniques that are both needed to implement the following financial expert tasks:

- Risk management and portfolio strategies: quantifying risk exposures, hedging of portfolios with derivative securities, and portfolio insurance.
- Valuation of derivative instruments.

DESCRIPTION OF CONTENTS

1. Unit 1. Introductory and institutional issues

1. Derivative markets
2. Organization of futures and options markets
3. Organization of OTC markets
4. Combined strategies
- 4.1. Combined strategies with options
- 4.2. Synthetic assets and structured products
5. Derivative Spanish market

2. Unit 2. Basic non-arbitrage valuation

1. Forward and futures contracts
2. Options

3. Unit 3. Introduction to hedging using futures

1. Basic principles and basis risk
2. Minimum variance hedging

**4. Unit 4. Valuation of derivatives in discrete time**

1. Discrete-time valuation models
2. The Cox-Ross-Rubinstein binomial model
3. Relationship with diffusion processes: binomial approximation to Black-Scholes
4. Valuation of exotic options with discrete-time models

5. Unit 5. Continuous-time valuation (PDE approach): Black-Scholes model and extensions

1. One-factor models
 - 1.1. Tradable asset (price variable)
 - 1.2. Non-tradable underlying variable (state variable)
2. Two-factor models
 - 2.1. Non-tradable underlying variable
 - 2.2. Tradable asset
3. The Black-Scholes-Merton model and empirical evidence

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	60,00	100
TOTAL	60,00	

TEACHING METHODOLOGY

Theory classes, problem solving and exercises with computer.

EVALUATION

Final grades will be based on a final written exam that will include questions and problems regarding both theory and practice.

REFERENCES**Basic**

- John C. Hull (2015): Options, futures, and other derivatives. 9th ed., Pearson.



Additional

- Tema 4 / Unit 4:

- Bingham, N. H. and Rudiger Kiesel (1998): Risk: Neutral Valuation : Pricing and Hedging of Financial Derivatives, Springer.
- Lamberton, Damien and Bernard Lapeyre (1996): Introduction to Stochastic Calculus Applied to Finance, Chapman & Hall.
- Pliska, Stanley R. (1997): Introduction to Mathematical Finance : Discrete Time Models, Blackwell.

Tema 5 / Unit 5:

- Björk, T. (2004): Arbitrage theory in continuous time. Second edition, OUP.
- Duffie, D. (1996): "Dynamic asset pricing theory. 2nd ed.", Princeton University Press.
- Ingersoll, J.E. (1987): "Theory of Financial Decision Making", Blackwell Publishing.

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

English version is not available

En caso de tener que suspenderse la actividad presencial, el programa se reorganizará para poder continuar online con el desarrollo del Máster, manteniendo la calidad y el rigor tanto de las clases como de los métodos de evaluación. La Comisión Académica valorará la conveniencia de modificar la forma de evaluación de las asignaturas y cualquier posible cambio será anunciado al alumnado a la mayor brevedad posible.