COURSE DATA

DATA SUBJECT

Code: 42205
Name: Derivatives
Cycle: Master's Degree
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2081 - Master's Degree in Banking and Quantitative Finance	Facultat d'Economia	1	Annual

SUBJECT-MATTER

Degree	Subject-matter	Character
2081 - Master's Degree in Banking and Quantitative Finance	Compulsory subjects	COMPULSORY

COORDINATION

TORRO I ENGUIX HIPOLIT

CARCHANO ALCINA OSCAR

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)".

COMPETENCES / LEARNING OUTCOMES

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. Valuacion 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

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

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)
3. The Black-Scholes-Merton model and empirical evidence

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Computer classroom practice	15,00
Classroom practices	15,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	0,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**0,00**

TEACHING METHODOLOGY

Theory clases, 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

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

- 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.