

15F020

3 ECTS

## Pricing Financial Derivatives II

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### Introduction

In this course we will apply the machinery introduced in the course Pricing Financial Derivatives I to more general option contracts such as exotic and American options. We will also see how this theory extends to stochastic interest rates models in order to price interest rates derivatives.

### Objectives

The main purpose of this course is to see how general financial products such as interest rates derivatives and exotic and American options work, how are they used, how are they priced and how financial institutions hedge their risks when they trade the products.

### Required Background Knowledge

Only opened for students enrolled in the course Pricing Financial Derivatives I

### Learning Outcomes

By the end of the course, the students will be able to see how the machinery of Itô calculus introduced in the course Pricing Financial Derivatives I can be extended to evaluate the price of more sophisticated financial derivatives. Practitioners from banks will be invited to give seminars to students.

### Methodology

Slides containing all the material will be exposed in class and completed with explanations in the white board. There will be a list of exercises for each session that will be solved during the TA sessions.

### Evaluation

Homework assignments (40%) and final exam (60%). The homework assignments are done in groups of 2-3 students and contain numerical exercises to be done in Matlab (or similar software such as R or Python). The final exam will contain theoretical exercises similar to those done during the TA classes.

### Course contents

Mainly chapters 8-14 of Joshi's book and chapters 11-19 of Wilmott's book (see references below).

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Specify a description, materials and cases that will be worked in class:

Session	Title, materials and cases
1	Introduction
2-3	Barrier options
4	Multi-look exotic options and Asian options
5	American options
6-10	Pricing interest rate derivatives

### Bibliography

Joshi, M.J. The Concepts and Practice of Mathematical Finance 2n Edition Cambridge University Press, 2008

Paul Wilmott introduces quantitative finance, Wiley, second edition, 2007

### Professor's Biography

Eulalia Nualart has a Tenured Associate Professor position at the Department of Economics of the University Pompeu Fabra since 2012. Before she had a permanent research and teaching position at the Department of Mathematics of the University of Paris 13, after doing a PostDoc at the University of Paris 6, with a research fellowship from the National Swiss Foundation. She earned her PhD in Probability from the École Polytechnique Fédérale de Lausanne in 2002. She broadly works in the field of stochastic analysis and its applications to stochastic differential equations and stochastic partial differential equations.