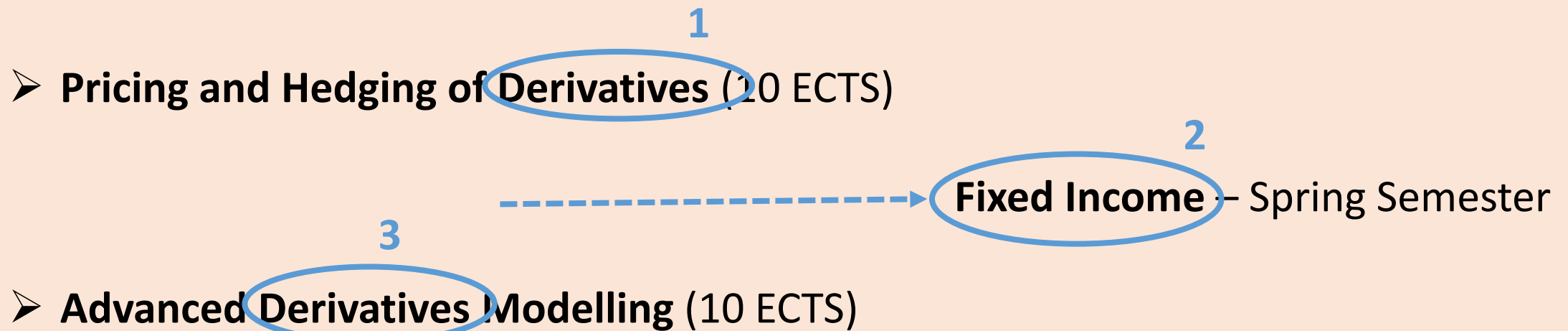


Finance Courses - Fall 2019

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Pricing and Hedging of Derivatives (10 ECTS)

Here we cover the fundamental concepts:

- Understanding the characteristics of liquidly traded derivatives – mostly, we focus on options - with some detour.
- Understanding the benchmark models used to price and risk manage derivatives products
 - Main focus is on local volatility models – diffusion based generalizations of Black-Scholes model
 - Touch upon more advanced models – Stochastic volatility models
- Understanding the martingale approach to arbitrage theory, i.e., the connections between absence of arbitrage, market completeness and the existence/uniqueness of martingale measures.

Finance

Model Analysis
With a view to
industry practice

Abstractions,
in both
points above

How are we going to do all that?

- Stochastic Calculus will be the main mathematical tool, and we shall cover the needed fundamentals.
 - But, this is not a strictly math course, and the approach will be operational/intuitive.
 - To fill all the gaps, we recommend you follow the 'Stochastic Calculus' course which runs at the same time.

- Models will be analyzed from the theoretical point of view but there will be equivalent focus on bringing the models to life.
 - Analysis based on implementations and empirical data will be just as important as the beautiful theory they are built upon.
 - Matlab is the software of choice.

Course Specs

- Instructor: Elisa Nicolato.
- Academic prerequisites: 'Investments and Finance', or similar course.
- It is **highly** recommended to follow 'Stochastic Calculus' at the same time.
- There will be periodic assignments (2-3) to practice both theoretical concepts as well numerical implementations.
 - Also 2-hours tutorial sessions every second week.
- Exam details: At the end of the semester students write a report in groups of max three. One week to write it. Following that, there will be a 30 minute individual oral examination with 30 minutes for preparation.

Advanced Derivatives Modelling (10 ECTS)

- Instructors: Elisa Nicolato and Thomas Kokholm.
- Academic prerequisites: 'P&H', 'Stochastic Calculus'.
- The course is divided in two parts:
 - First quarter: Lectures
 - Second quarter: Written report - groups of max 2 students - based on topics handed out. Supervision throughout the writing period.
- Exam details: individual oral evaluation based both on curriculum and report presentation.

Topics

- Advances in modelling
 - Detailed analysis of stochastic volatility models
 - Models allowing for jumps in returns, in volatility, in both
- Advances in numerical methods for pricing
 - Expansions and approximations techniques
 - Fourier transform techniques
- Advances in derivatives markets
 - Variance/volatility swaps
 - VIX futures/options
 - Consistent modelling of variance swaps/VIX index futures and S&P 500