Course:	**Asset Pricing**
Faculty:	**Jordi Caballé**
Term:	First Semester
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Office Hours:	Upon request. Send an e-mail for an appointment.

Description and Objective:

This course reviews the techniques of both portfolio selection and security valuation and presents the classical models of asset pricing (CAPM and APT) in static economies. It also covers the techniques and models of portfolio selection and asset pricing in dynamic economies in both discrete and continuous time and the characterization of the term structure of interest rates. The course will introduce the basic techniques of stochastic calculus, like the Ito's lemma and the Hamilton-Jacobi-Bellman equation, which are needed for continuous-time finance. Finally, the course will present the dynamic arbitrage techniques aimed at pricing derivative securities like options and forward and futures contracts. If time permits, it will also cover the role of asymmetric information and market power in financial markets.

Slides, class notes, and problem sets can be downloaded from the professor's webpage.

Outline:

1. INVESTMENT UNDER UNCERTAINTY AND THE VALUATION OF CONTINGENT CLAIMS.

1.1. Risk aversion and the comparative statics of portfolio selection.
1.2. State contingent claims and complete markets.
1.3. Valuation by arbitrage of derivative securities.
1.4. Incomplete markets.

2. MEAN-VARIANCE ANALYSIS AND CLASSICAL ASSET PRICING MODELS.

2.1. Mean-variance analysis: restrictions on preferences and return distributions.
2.2. The portfolio frontier: derivation and properties.
2.3. The Capital Asset Pricing Model (CAPM).

2.4. Portfolio separation (I): restrictions on return distributions.
2.5. Portfolio separation (II): restrictions on utility functions.
2.6. The Arbitrage Pricing Theory (APT).

3. DYNAMIC ASSET PRICING IN DISCRETE TIME.

3.1. Dynamically complete markets.
3.2. Dynamic valuation by arbitrage: the equivalent martingale probability measure.
3.3. Portfolio selection in discrete time.
3.4. The Consumption Capital Asset Pricing Model (CCAPM) and the Dynamic CAPM.
3.5. Equilibrium valuation in macroeconomic dynamic models.

4. INTEREST RATES, FORWARDS, FUTURES AND OPTIONS.

4.1. The term structure of interest rates in discrete time.
4.2. Forward and futures prices.
4.3. Option pricing (I): theory of rational option pricing and put-call parity.
4.4. Option pricing (II): the binomial approach and the Black-Scholes formula.

5. STOCHASTIC CALCULUS AND DYNAMIC ASSET PRICING IN CONTINUOUS TIME.

5.1. Stochastic processes in continuous time and its representation.
5.2. Stochastic integrals.
5.3. Itô's lemma and statistic properties of Itô processes.
5.4. Stochastic optimization in continuous time: the Hamilton-Jacobi-Bellman equation
5.5 Portfolio selection in continuous time
5.6. Valuation in continuous time (ICAPM).
5.7 Option valuation in continuous time: the Black-Scholes model.
5.8 Girsanov's theorem and the equivalent martingale probability measure.
5.9. Option valuation with stochastic volatility.
5.10 The term structure of interest rates in continuous time.

6. MARKET MICROSTRUCTURE AND ASYMMETRIC INFORMATION IN FINANCIAL MARKETS.

6.1. Competitive models with fully revealing prices.
6.2. Competitive models of noisy rational expectations.
7.3. Models with imperfect competition.
6.4. Bid-ask prices (I): inventory costs.
6.5. Bid-ask prices (II): adverse selection.

References:

- Cochrane, J. H.: Asset Pricing. Princeton University Press. Princeton, NJ.
- Duffie, D.: Dynamic Asset Pricing Models. Princeton University Press. Princeton, NJ.
- Huang, C.F. and R.H. Litzenberger: Foundations for Financial Economics. North-Holland. New York, NY.
- Ingersoll, J.: Theory of Financial Decision Making. Rowman and Littlefield. Totowa, NJ.
- Pennacchi, G.: Theory of Asset Pricing. Pearson Addison Wesley.

Grading:

Students must solve five problem sets. Problem sets will have a weight of 20% in the final grade. There will be a final exam, which will have a weight of 80% in the final grade.

Note: Some of this year's exercises have appeared on this course previously. Thus, it is possible, even likely, that you might be able to obtain solutions to these exercises that I have handed out earlier. However, I strongly recommend you not to look at these solutions when solving the exercises. By handing in your answers, you declare that the solutions are your own and that they are not based on solutions from previous years. If I catch you cheating, I will give you 0 points from the exercises. Even more significantly, you will suffer a reputation loss within IDEA (and academia in general) by presenting someone else's work as your own. Check out the definition of "plagiarism" and how it is viewed in academic circles if you do not immediately grasp what the consequences of cheating will be.