Stochastic Optimal Control in Economics

Course title - Intitulé du cours	Stochastic Optimal Control in Economics
Level / Semester - Niveau /semestre	M2 / S2
School - Composante	Ecole d'Economie de Toulouse
Teacher - Enseignant responsable	Stephane VILLENEUVE
Lecture Hours - Volume Horaire CM	30
TA Hours - Volume horaire TD	
TP Hours - Volume horaire TP	
Course Language - Langue du cours	Anglais
TA and/or TP Language - Langue des TD et/ou TP	

Teaching staff contacts - Coordonnées de l'équipe pédagogique :

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MF 304 bis

Course's Objectives - Objectifs du cours :

This lecture is motivated by the conviction that stochastic control methods should be part

of financial economists set of technical tools to study modern corporate finance. This

course requires a taste for mathematical rigor and asks for skills in probability theory.

Contents

- Mathematical Preliminaries: Brownian motion and continuous martingales, Itô's

calculus and stochastic integral.

- Examples of Stochastic Optimization problems: Portfolio Allocation, Optimal

Investment timing, Optimal liquidity Management

- Solving Problems: Dynamic Programming and HJB equations.

- A primer on dynamic Moral Hazard.

Bibliography/references - Bibliographie/références :

Mathematics:

• Karatzas and Shreve: *Brownian Motion and Stochastic Calculus (Graduate Texts in*

Mathematics), Springer.

• Oksendal: *Stochastic Differential Equations: An Introduction with Applications*, Springer

• Pham: *Continuous-time Stochastic Control and Optimization with Financial Applications (Stochastic Modelling and Applied Probability)*, Springer

Economics:

• Stockey and Lucas: *Recursive Methods in Economics Dynamics*, Harvard University Press

• Moreno-Bromberg and Rochet: *Continuous-Time Models in Corporate Finance: A User's Guide*, Princeton University Press.

• Dixit and Pyndick: *Investment under uncertainty*, Princeton University Press.