

# **Optimal Investment. (L16)**

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The course will study a wide range of optimal investment/consumption problems. Examples will be drawn from both discrete- and continuous-time financial models. The following provisional list of topics indicates some of the intended content.

- self-financing portfolios and the wealth equation,
- the dynamic programming principle and the Bellman equation,
- martingale methods and Lagrangian duality,
- mutual fund theorems,
- the Hamilton–Jacobi–Bellman partial differential equation,
- utility indifference pricing,
- market equilibrium models,
- backward stochastic differential equations,
- forward utility functions,
- optimisation under parameter uncertainty

## **Desirable Previous Knowledge**

A firm grasp of martingale theory and a working knowledge of stochastic calculus will be assumed. The course complements Part III Advanced Financial Models.

## **Introductory Reading**

Lecture notes will be distributed. Additionally, the following books may be helpful.

1. D. Kennedy. (2010) Stochastic Financial Models. Chapman & Hall/CRC Financial Mathematics Series.
2. I. Karatzas and S. and Shreve. (1998) Methods of Mathematical Finance. Springer.