# STOCHASTIC DYNAMIC OPTIMIZATION

**Given by** Massimiliano Corradini | Researcher, Department of Business Studies – Roma Tre University

**When** Monday 10th June, h: 11:00 – 14:00; Friday 14th June, h: 11:00 – 14:00; Monday 17th June, h: 11:00 – 14:00; Thursday 20th June, h: 11:00 – 14:00

**Where** Computer lab (small room), ground floor | Department of Business Studies – Roma Tre University | Via Silvio D'Amico, 77, 00145 - Rome, Italy | Google Maps

## Main Topics:

### LECTURE I (3 hours)

- Elements of Real Analysis
- Lebesgue Integral
- Elements of Probability Theory

### LECTURE II (3 hours)

- Stochastic Processes
- Markov Processes. Discrete-time and Continuous-time Markov Processes
- Diffusion Processes
- Pure Jump Processes
- Diffusion Processes with Jump
- Master and Fokker-Planck Equations (mentions)

### LECTURE III (3 hours)

- Mathematical Models of Financial Markets
- Ito's Lemma, Feynman-Kac's Theorem, Change of Measure: the Girsanov theorem.
- Pricing of Derivative Contracts in Complete and Incomplete Markets

### LECTURE IV (3 hours)

- Stochastic Optimization
- Bellman Equation
- Applications of the Bellman Equation to Portfolio Selection and Valuation of Derivative Contracts

## Material:
Supporting material will be provided during the course.