Course Objective

Credit risk arises when one or both counterparts of a contract fails to honor the promised payment. Credit derivatives, which have been introduced since the mid 1990s, are financial products allowing market participants to transfer and hedge credit risk. Some of these instruments—credit default swaps and CDOs—have come into focus during the recent financial crisis. This course will focus on measuring credit risk and pricing of credit derivatives.

Prerequisites:
All students are assumed to be familiar with the material covered in:

- IEOR E4701: Stochastic Models for Financial Engineering (or an equivalent course on stochastic processes): basic knowledge about the Poisson process, Markov chains, and Brownian motion.
- IEOR E4707: Continuous-time Models. Students following the course shall be assumed familiar with option pricing theory at the level of the Black Scholes model.
- IEOR E4703: Monte Carlo Simulation: Monte Carlo simulation, variance reduction.

Textbooks:

- D. O’Kane (2008), Modelling Single-Name and Multi-Name Credit Derivatives, Wiley.

Recommended references:


Time and Venue:
Time: Tuesday and Thursday 05:40pm–06:55pm; Room: TBA

Outline (subject to change):

- Credit risk and default risk. Recovery rates and credit spreads;
- Credit Derivatives: overview and market structure;
- Modeling credit risk: value-of-the-firm approach;
• Modeling credit risk: reduced form approach;
• Single name credit derivatives: Credit default swaps (CDS);
• Portfolio credit risk and default correlation;
• Collateralized Debt Obligations (CDOs);
• Multi-name credit risk models;
• Portfolio loss models;
• Counterparty risk.

Evaluation:
• Homework assignments
• Midterm exam
• Final exam