MTH 9878

**Interest Rate Models**

Andrew Lesniewski

**Time and location**: Thu 6:05 – 9:00 pm, VC 9-140

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**Office hours**: Thu 4:00 – 6:00 pm, or by appointment

**TAs**: Professor Ivan Matic and Alan Coman

**Prerequisites**: Familiarity with option models, stochastic methods, and strong computing skills.

**Course description**: The course addresses the quantitative interest rate models commonly used in the financial industry, and their applications to the pricing and hedging of fixed income derivatives. The emphasis is on practical aspects of modeling, and the significance of the models for the valuation and risk management of portfolios of widely traded derivative instruments.

**Textbook:** Lecture notes to be posted online. A list of recommended readings will be provided with each set of notes.

**Assignments:** Homework assignments will be given approximately biweekly, for a total of about six. Additionally, there will be two programming projects in a language of your choice.

**Grading:** Homework and computer projects: 50%, Final Exam: 50%

Topics covered include:

* LIBOR and OIS
* Girsanov, Numeraires, and All That
* Options and Smiles, SABR model
* Convexity and CMS
* Short Rate Models
* LIBOR Market Model
* Backward Induction and Monte Carlo Simulations
* Modeling Event Risk
* Mortgage backed securities and prepayment modeling
* Risk Management: Sensitivities
* Risk Management: VaR and Beyond
* Trading strategies in fixed income markets