

# Math-449: Fixed Income Mathematics

## Description

This course is an introduction to perhaps the most important subject in Financial Mathematics: interest rates and fixed income instruments. These topics serve as a foundation to more advanced topics in Financial Mathematics including derivatives, credit default swaps. Fixed income instruments, whose cash flows are entirely predictable, can be priced more objectively than other financial securities such as stocks and stock options. The course will emphasize **implementation in Excel**.

## Goals of the Course

My main goals are to make sure that you

1. Understand the mechanics of the fixed income securities
2. Have command of the mathematical techniques used to evaluate the price and price sensitivity to market moves
3. Know and understand the industry conventions
4. Able to implement all concepts as useful applications in Excel

## Basic Information

Lecturer: Pavel Grinfeld

Office: Korman-291

Email: pg@math.drexel.edu

Phone: 215-219-3548 (but don't call unless in emergency)

Office Hours T/TR 4-5:30pm

**Lecture Schedule: 12:30 pm-1:50 pm LEBOW 134**

## Preliminary Topics

- 1 Introduction to bonds. Compounding conventions. Continuous compounding.
- 2 Excel lab. Duration. Convexity.
- 3 Bond strategies. Portfolio immunization.
- 4 Yield curve. Curve stripping. Yield curve arbitrage.
- 5 Review. Midterm.
- 6 Mortgages and mortgage calculators. PI/O securities. Annuities.
- 7 Swaps. Swap curve.
- 8 Introduction to FX. FX futures.
- 9 Final

## Assignments/Grading

1. Frequent homework assignments, possibly weekly (40%)
2. Midterm (30%)
3. Final (30%)