

INTRODUCTION TO FINANCIAL ENGINEERING

ISyE 6227 (Summer Session)

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Class time: 1pm Tues/Thur
Office Hours: 3:15-4:15 Tuesdays or by appointment

1. Course Materials

The required text is *Investment Science* by Luenberger, Oxford University Press, 1998 or 2013. **Supplemental notes, handouts and exercises will be posted regularly and represent an integral part of the course.**

2. Course Description and Objectives

Students learn the core concepts, issues and advanced techniques for financial engineering. Students also learn the economic decision analysis of capital investment and for managing and valuing project risk. Topics cover: institutional features of financial markets: bond, equity, derivatives and commodities. Probabilistic tools for modeling and analyzing financial markets: notions of complete and incomplete markets, arbitrage, equivalent martingale measures, the pricing of contingent claims by Arrow-Debreu state securities. Discrete-time asset pricing models: the capital-asset-pricing model and the binomial option pricing model; dynamic hedging and no-arbitrage pricing. Continuous-time asset pricing models: Brownian motions and geometric Brownian motions; Martingales, Ito's formula and elementary stochastic calculus, Black-Merton-Scholes option pricing model. Utility maximization. The term-structure of interest rates and its modeling.

3. Course Organization

Class time will be used to motivate, explain, illustrate and expand concepts and techniques. If you must miss class it is your responsibility to catch up. It is your responsibility for obtaining class materials before each class. On occasion you will be requested to read a handout or certain parts of the book and be **prepared** to discuss during class.

4. Grading

Your grade will be determined as follows: Homework (20%), Project: due in June 22 (40%), and Final Exam [currently scheduled in the end of July] (40%). **“No” re-grading.**