Financial Engineering
FNCE 399,890: Meets Tu-Th 10:30a-12n

1. Course Description

The use of derivatives contracts has ballooned in the last twenty years. These contracts are now undertaken by a variety of end-users; and financial institutions and investment banks routinely structure them. Innovations in these markets are rapidly imitated because these contracts are (complex) combinations of existing securities or they are seen as equivalent to dynamically-adjusted positions in other securities.

The objectives in this course are twofold.

- First, to provide the student with the necessary skills to design (and reverse-engineer), value, and hedge these contracts. While the transfer of risk is often the prime motive in designing these contracts, the accounting, regulatory, and tax treatments accorded to these contracts make them attractive to a particular clientele of end-users.
- Second, to enable the student to absorb the analytical arguments in the (increasingly) technical publications that deal with innovations in these contracts — now in the in-house research notes of financial institutions and in practitioner-oriented journals — and to apply them.

The following topics (not a complete list, and not necessarily in this order!) will be covered: dynamic hedging and valuation with transactions costs; equity swaps and structures; interest-rate models; swaps and complicated swap structures in interest rates and currencies; credit derivatives; commodity-linked securities and swaps. We’ll use case studies as quick examples whenever possible.

This is an advanced course, where knowledge of the pricing of futures and options (especially backward-recursion with binomial trees, as well as the institutional setting of exchange-traded futures and options — covered in Finance 206 or 717) will be taken for granted, but will be very briefly reviewed in an early lecture. Basic ideas from probability and statistics, as well operations (especially partial derivatives) from the calculus will be assumed. Grades will be based on class participation, problem sets, case-writeups, and a group project report.

2. Pre-requisites

1. A strong motivation and a willingness to work hard — essential in this course — can easily substitute for prerequisites. A background knowledge of financial markets is useful, though, so it is desirable but not essential that you’ve taken the Core finance classes.
2. For Undergrads: Stat 101 & 102; Finance 206 (Spec Markets) required.
3. For MBAs: Core Statistics or higher. Finance 717 (Spec Markets) required.
4. Knowledge of spread-sheet programming, eg Excel, is expected; the ability to program in Visual Basic or use software like Crystal Ball is desirable but easily picked up, and will serve you well later; some higher level programming such as Mathematica or MATLAB, is useful but not required.

If you need more information, or if you are unsure about your readiness to take the course, please either come by my office (3259 SHDH), or send e-mail (krishna@wharton.upenn.edu), or call 8-6206.