Course Syllabus – Valuation for Financial Engineering FRE-6103

David C. Shimko, Industry Full Professor of Financial Engineering
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Office:	Room 271, 12 Metrotech, 26th Floor
Office hours:	By email appointment
Grading assistant:	TBD

Course description:

FRE 6103 introduces financial engineers to robust risk-based valuation methods in discrete and continuous time. This includes four major applications: cash flows, traded derivative contracts, nontraded and embedded derivatives, and corporate assets & liabilities.

- "Cash flows" refers to risk-free and risky payments or expenditures.
- "Traded derivatives" include a high level treatment of forward contracts and the most commonly traded option contracts.
- "Nontraded and embedded derivatives" refer to contingent cash flows created in the normal processes of contracting and asset management
- "Corporate assets" refer to claims to cash flows owned and managed by corporations
- "Corporate liabilities" refers to corporate-issued securities or other payment obligations incurred by corporations

This is not a generalist MBA finance course. Being designed for engineers, it focuses on deep analytical methods, is computational in nature, and is driven by practical problems encountered by finance professionals. Being an introductory core course, it does not go into depth into all subject areas, but provides a suitable and broad foundation for advanced elective courses in advanced valuation, corporate finance, investment, derivatives, and trading.

Instructor information:

Resume in brief:

- Assistant Professor, Marshall School, USC
- Adjunct Professor, Harvard Business School
- Adjunct Professor, NYU Courant
- Head of Commodity Derivatives Research, JPMorgan
- Head of Credit Research, JPMorgan
- Head of Risk Management Advisory, Bankers Trust
- CEO and co-founder of Risk Capital, an independent risk advisory firm
- CEO and co-founder of CreditCircle, a marketplace lending platform
- Director of public, private and non-profit entities including GARP
- Widely published in derivatives valuation, risk management, commodities and credit

Prof David C. Shimko

Class organization:

Required texts: Valuation for Financial Engineers, class notes to be provided by Prof Shimko. This will be provided free of charge on NYU Classes. Corporate Finance, 4th Edition (MFE Version) by Ivo Welch is recommended. The Welch text is available free online or a print copy may be purchased. Other readings may be used as supplements and will be provided to students as needed.

NYU Classes: Please follow the course requirements online weekly, as they are likely to change as the term progresses.

Recommended calculators: I personally prefer the traditional HP 12C, and will use it in class. This does not mean you have to use it. It requires "reverse Polish sequences" for which I will provide an instruction note. You may also use the Texas Instrument BA II PLUS (Professional) calculator (or TI 83, TI 83 Plus). You may also use a smart phone app or simply use Excel in class.

Recommended analytic software: I prefer Excel and VBA, not for its elegance or ease of use, but for the ease of collaboration and visualization with colleagues, supervisors and clients. **You must have access to Excel to complete your assignments.** You are also welcome to use Python or R for technical work, and for completing your projects.

Course grading: This will be a combination of homework (25%), the midterm exam (25%), your project with one partner (25%), and class participation (25%).

Missed class policy: If you do miss a class, it is your responsibility to cover the course with notes from your fellow students. I cannot make class notes or recordings available.

Office hours: GA hours TBD. Prof Shimko by email appointment on the 26th Floor of 12 Metrotech.

NYU Class Prerequisites:	None for FRE students
Functional prerequisites:	Calculus, Linear algebra
Analytical skills taught:	Basic stochastic calculus, simulation, financial reasoning

Class outline, subject to revisions:

Lecture 1	Valuation models for known cash flows and discount rates
2	Real world valuation issues: Compounding frequency, taxes, currency, inflation, default
3	Information implied by bond prices
4	Portfolio Theory & CAPM/APT benchmarks
5	Simulation and benchmark valuation of risky cash flows
6	Forward contracts: standalone and benchmark valuations
7	Option valuation
8	Embedded derivatives: Contracts & securities
9	Private valuations
	Textbook Exam
10	Corporate financial statement modeling
11	CASE: Corporate capital budgeting decisions including real options
12	CASE: Corporate risk management decisions
13	CASE: Corporate financing & capital structure decisions including security selection
14	FINAL PROJECT (pairs)