Syllabus as of November 30th, 2025

Syllabus for **FRE-GY 6103 I**

Valuation for Financial Engineering, Spring 2026

Instructor and Grading Assistant Contact Info and Preliminary Schedule:

Instructor: Brian R Lessing, (917) 417-7317 (mobile), brl255@nyu.edu,

(For time sensitive matters, I suggest sending a text alerting me to your email.)

Teaching Assistant (TA): TBD

TA Contact Info: TBD

TA Office Hours and Location: TBD
(Please note, TA office hours are subject to change.)

Course Structure:

Anticipated class sessions for lectures, midterm exam and final exam are as follows:

THE FOLLOWING SCHEDULE IS TENTATIVE, AND MAY BE ADJUSTED IF NECESSARY, INCLUDING TO BE CONSISTENT WITH THE FINAL SPRING 2026 FRE ACADEMIC CALENDAR

Tues 1/20 regular class	Tues 3/3 regular class	Tues 4/14 regular class
Tues 1/27 regular class	Tues 3/10 mid-term exam*	Tues 4/21 regular class
Tues 2/3 regular class	Tues 3/17 spring break	Tues 4/28 regular class
Tues 2/10 regular class	Tues 3/24 regular class	Tues 5/5 regular class
Tues 2/17 Legislative Monday	Tues 3/31 regular class	Tues, 5/12 final exam**
Tues, 2/24 regular class	Tues 4/7 regular class	

*This date for the mid-term exam is approximate; it might be rescheduled earlier or later.

**This date for the final exam is approximate; it might be rescheduled earlier.

We will meet at Jacobs Hall, 6 Metrotech, Rm. 317 from 6 to 8:30 p.m. with a 5-10 minute break.

Additional recorded lectures may be added to the above schedule during the semester—see below.

Course Requirements:

Students will be expected to master all material from the assigned chapters of the required text book, the class lecture slides, any lecture notes, and the homework. Class lectures will touch on many of the topics from the text book and slides, but will not cover everything. Independent study of the text book and lecture slides, as well as of any additional notes or recorded lectures, will be both necessary and expected.

Course grades will be based upon the final exam, the midterm exam, and class participation including homework. Homework assignments for each chapter or additional topic will generally be due by the next class session after the lecture or other material for that chapter or additional

topic has been provided. However, please review the course requirements online in NYU Brightspace on a weekly basis, as they are likely to be adjusted as the term progresses.

Syllabus as of November 30th, 2025

Students are encouraged to participate fully in class discussions. It's anticipated that the midterm exam, final exam, and class participation including homework will count for approximately 30%, 30%, and 40% respectively of the final course grade. Although the exact weightings will depend on performance, it is anticipated that final scores will be ranked, with approximately the top 50% of the students receiving A or A- and approximately the bottom 50% receiving B+, B or lower, so that the average target grade is 3.67.

Additional notes, slides, and/or (video or audio) recorded lectures (beyond the slides and lectures for regular in-person class sessions as scheduled above) may be posted to Brightspace on an ad hoc basis throughout the semester for independent study. Any such additional notes, slides and/or recorded lectures could relate to chapter topics (as listed below), or alternatively could cover information not discussed in the textbook and/or regular class sessions. Information contained in any such additional notes, slides and/or recorded lectures may be used in creating class homework assignments and/or in setting exam questions. Please be aware that statistics relating to access and use of posted materials are automatically collected, and may be consulted in assessing each student's class participation.

The midterm and final exams will be "open book" in the sense that reference to specified written materials (to be discussed) will be permitted. Reference to any other notes or written materials, or any other electronic source, will not be permitted.

Missed class policy: If you miss a class, it is your responsibility to cover the session with notes from your fellow students, study of the textbook, review of the lecture slides or notes, and watching any available class recordings.

It is expected that each student will have the necessary equipment in their possession to do numerical calculations by hand, via handheld calculators or via personal computers to do homework assignments, participate in class sessions, and to take the mid-term and final exams. Please plan on having Excel available during each class. A financial calculator will be needed for the exams. You must have access to Excel (including VBA if necessary) to complete your assignments. You are also welcome to use Python or R for technical work, **but your final results must be presented fully in your own handwriting, Word, Excel or any combination of these**.

Learning Objectives:

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, including contract reserves held by life insurance companies

Syllabus as of November 30th, 2025

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

Insurance-related topics such as elementary insurance and annuity models, actuarial valuation of liabilities (reserving), immunization, and/or asset liability matching as well as other topics (for example, multifactor models) may be introduced and/or used to provide practical examples of theoretical concepts from time to time during the course.

Course Prerequisites: Students will be assumed to have a basic understanding of calculus, linear algebra, probability, statistics, and the theory of interest. A few actuarial models requiring life contingency mathematics will also be introduced. However, this material will be briefly summarized as it is utilized.

Course Objectives: To gain a basic understanding and familiarity with risk-based valuation methods, primarily in discrete time. To understand the concepts, be able to explain and use the concepts to solve problems and be able to apply the models and techniques of calculation developed in class or studied independently to arrive at correct formulaic or numerical results.

Readings: Subject to class participation, interest, topic mastery, and any updates, we'll attempt to cover chapters 1-9 of the required text book (see below for text particulars) during the regular class sessions, devoting approximately 1-1 ½ sessions (see above for session schedule) to each chapter with independent study assignments, catch-up and review as needed. If there is any additional time, we will cover additional topics such as the ones mentioned above from other sources.

The chapter topics are as follows:

Chapter One: Valuation Methods for Financial Engineers
Chapter Two: Annuities and Perpetuities, Basic and Complex
Chapter Three: Complications and Resolutions
Chapter Four: Bonds
Chapter Five: Simulation
Chapter Six: Stochastic Processes in Finance
Chapter Seven: Risk, Capital and Valuation
Chapter Eight: The Single Period CAPM and CFPM
Chapter Nine: Derivative Pricing in the Static
CAPM

Required Materials:

We will use the following textbook:

Valuation for Financial Engineering, by David C. Shimko. Drafts of chapters from this textbook will be provided free of charge on NYU Brightspace. Corporate Finance, 5th Edition (MFE Version) by Ivo Welch is recommended for those needing or desiring more background or depth in traditional corporate finance. The Welch text is available free online, or a print copy may be purchased from Amazon. Other readings may be used as supplements and will be provided to students as needed.

Syllabus as of November 30th, 2025

Disability Disclosure Statement:

Academic accommodations are available for students with disabilities. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

Inclusion Statement:

The NYU Tandon School values an inclusive and equitable environment for all our students. I hope to foster a sense of community in this class and consider it a place where individuals of all backgrounds, beliefs, ethnicities, national origins, gender identities, sexual orientations, religious and political affiliations, and abilities will be treated with respect. It is my intent that all students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. If this standard is not being upheld, please feel free to speak with me.

Academic Misconduct:

A. *Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack on the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.*

B. *Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:*

    1. *Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.*
    2. *Fabrication: including but not limited to, falsifying experimental data and/or citations.*
    3. *Plagiarism: Intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.*
    4. *Unauthorized collaboration: working together on work that was meant to be done individually.*
    5. *Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission have been received from the course instructor(s) or research adviser involved.*
    6. *Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.*

Syllabus as of November 30th, 2025

Policy on Student Use of Artificial Intelligence (AI) Tools:

Students are <u>prohibited</u> from using AI tools (e.g., ChatGPT, Dall-e, Perplexity, etc.) <u>in any way</u> during (1) <u>the midterm exam</u> or (2) <u>the final exam</u>. *Otherwise:*

1. *Homework, papers or any other non-exam projects produced by students with assistance from AI technology will be evaluated using criteria similar to those applicable to work produced without use of such technology.*
2. *Students' final work products should be produced by their own efforts. Any use of AI tools should be limited to finding information, brainstorming, refining your ideas, or confirming accuracy. AI tools should never be used for writing entire sentences, paragraphs or papers. Also, beware of AI "hallucinations" (see cautions below)..*
3. *Any information students submit based on an AI query should not violate intellectual property laws or contain misinformation or unethical content.*
4. *AI tools should never be used to replace the effort needed to learn course material.*
5. *Students must acknowledge any use of AI tools in their work by explaining what, how, and in what part of the work the tools were used.*
6. *All work should be explained sufficiently to permit the instructor and/or teaching assistant to understand facts, assumptions, principles, and steps upon which the work was based. All such facts, assumptions, principles, and steps should originate from or be explained in terms of material contained within this course, and not simply be extracted without such linkage from some external source.*
7. *All work should be explained in each student's own words and be clear and detailed enough to show each student's understanding of the facts, assumptions, principles, and steps on which their work is based.*
8. *All work will be evaluated in terms of its correctness or incorrectness. Students should bear firmly in mind that AI tools have been trained to produce written output that sounds confident and plausible, even when such output is partially or even entirely incorrect.*
9. *To the extent that any student's work is judged as not meeting these criteria (for example, as not being based on material covered in the course, as not being expressed in the student's own words, or as not demonstrating the student's understanding), the student may not get full or even partial credit for such work.*
10. *Students should be prepared to orally explain, defend, elaborate upon, and/or demonstrate their understanding of any work they have submitted, <u>including any answers to homework assignments, quizzes or exams, at any time during the course</u>.*
11. *Any student use of AI technology in coursework must not violate the policy of Academic Integrity for Students at NYU which has three elements:*
    a. *Plagiarism, which involves presenting work without adequate acknowledgement of its source (e.g., another person, the student's own earlier work, an AI tool, etc.), as though it were the student's own current work;*
    b. *Cheating, which involves deceiving faculty members about the student's (or other students') mastery of the material, for example by using unauthorized materials, by sharing copies of exams by technological or any other means, or by copying or allowing others to copy answers on an exam; and*
    c. *Violating policies set by the student's school, department or division, or instructor.*
12. *The above Policy on Student Use of AI Tools may be updated and/or modified (on a prospective basis) at any time during the semester.*

Syllabus as of November 30th, 2025

NYU's Calendar Policy on Religious Holidays:

NYU's Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious observances. You must notify me in advance of religious holidays or observances that might coincide with exams, assignments, or class times to schedule reasonable alternatives. Students may also contact religiousaccommodations@nyu.edu for assistance.