NYU TANDON SCHOOL OF ENGINEERING
Finance & Risk Engineering

FIN-UY 3503,
Financial Risk Modeling & Analytics

Instructor Information

- Dr. Arka P. Bandyopadhyay, Adjunct Professor
- Office hours: Wednesday 2:00 – 4:00pm at 1 MetroTech Center, 10th Floor or by appointment (reach out to Syed Ahzam Tariq (sat10045@nyu.edu)). TBD in extreme weather.
- apb321@nyu.edu

Course Information

- FIN-UY 3503 I
- Course Title: Financial Risk Modeling & Analytics
- Course Description: See Course Overview and Goals below.
- Co-requisite or prerequisite: FIN-UY 2203 Corequisite(s): FIN-UY 2003 and FIN-UY 2103.
- Mondays from 6 pm – 8:30 pm; 1/22/2024 – 5/6/2024
- Classroom number and building: 6 MetroTech Center Room 200; Brooklyn Campus
- Virtual (online) meeting days and times: TBD in extreme weather.

Course Overview and Goals

This course focuses on how to optimize business strategies, qualitatively and quantitatively with respect to financial risk. Financial risk encompasses several risk factors: credit risk, market risk, operational risk, prepayment risk, sustainability risk to name a few. The course is organized around the principle that risk analysis consists, in part, of data collection and the building of mathematical models to describe the risk of failures in human resources, processes and technology. Beginning with a foundation for financial risk modeling and a focus on the modeling process, the course discusses probabilistic tools for risk modeling and statistical methods to calibrate models of risk. The quantitative assessment of risk uses the tools of probability, statistics, and actuarial science.

Upon completion of this course, students will be able to:

- Understand and explain financial risk.
- Appreciate different dimensions of financial risk.
- Apply the concepts learning in this class in real life.

Course Requirements

Class Participation

This is an advanced course. I expect students to be present in all classes. The content won't be repeated if you miss a class. If you miss more than one class without a valid reason, it will affect your class participation grade.

Assignments

Project 1, Project 2

Tests & Quizzes

Final Exam

Assigned Readings

My slides and materials uploaded on Brightspace.

Grading of Assignments

The grade for this course will be determined according to the following formula:

Assignments/Activities	% of Final Grade
Class participation	10%
Project1	30%
Project 2	30%
Final Exam	30%

Letter Grades

Letter grades for the entire course will be assigned as follows:

F	0
C	70
C+	76.67
B-	80

B	83.33
A-	90
A	93.33

Course Schedule

Topics and Assignments

Week/Date	Topic	Reading
Week 1, 1/22/24	What is Financial Risk? How do we model financial risk?	My slides
Week 2, 1/29/24	Profit Maximization and Risk Minimization as dual problems.	My slides
Week 3, 2/5/204	Credit Risk	My slides
Week 4, 2/12/24	Market Risk	My slides
Week 5, 2/19/2024	President's Day	
Week 6, 2/26/24	Prepayment Risk	My slides
Week 7, 3/4/24	ESG and Sustainability Risk	My slides
Week 8, 3/11/24	Climate Risk	My slides
Week 9, 3/18/24	Project 1 Presentation and Report	My slides
Week 10, 3/25/24	Spring Break	
Week 11, 4/1/24	Calculus for Modeling & Linear Models	My slides
Week 12, 4/8/24	Non-Linear Models	My slides
Week 13, 4/15/24	Probability & Statistics	My slides
Week 14, 4/22/24	Machine Learning Applications	My slides
Week 15, 4/29/24	Model Risk	My slides
Week 16, 5/6/24	Project 2 Presentation and Report	My slides
Week 17	Final Exam	My slides

Course Materials

Required Textbooks & Materials

- Mostly my slides and other materials

Resources

- **Access your course materials**: NYU Brightspace
- **Databases, journal articles, and more**: Bern Dibner Library (library.nyu.edu)
  NYU Virtual Business Library (guides.nyu.edu/vbl)
- **Obtain 24/7 technology assistance:** Tandon IT Help Desk (soehelpdesk@nyu.edu, 646.997.3123)
  NYU IT Service Desk (AskIT@nyu.edu, 212-998-3333)

Policies

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 upon 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.

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.