FRE6123
Financial Risk Management Syllabus

Instructor Information

- *Roza Galeeva, Adjunct Professor*
- *Office hours before the class 1-2 or by appointment*
- *Email: rg63@nyu.edu*

Course Information

- FRE6123
- Financial Risk Management
- Teach risk management from scratch, with business practice in mind
- Graduate Standing
- Tuesdays, 2-4.30 pm
- [Class room number and building] TBA
- [Virtual (online) meeting days and times, if any] TBA

Course Overview and Goals

The current financial crisis we are living in right now and its impact on the broader economy underscore the importance of financial risk management in today's world. Market and credit risk have been omnipresent in the portfolio of a typical financial institution and insurance companies and is becoming even more critical in these contemporary unprecedented times. Risk management is a unique domain, proving the importance of power of mathematics in real world and constantly posing new challenges in view of increasingly complex products and strategies.

The course teaches risk management from scratch, with business practice in mind. In each class we will introduce the necessary theory and discuss typical examples and cases.

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

- Students will get understanding of applications of mathematical tools in financial risk management and will be able to apply their risk management knowledge in real life
- Learn about the main markets and different risk measures
- Be prepared for interviews for internships and jobs

Course Requirements

Class Participation

The students are expected to attend the classes and participate actively. You should be using laptops/computers, we will be doing often work in the class. If for any reason you can't come to lecture, please inform me by email in advance.

Assignments

Weekly home assignments, due on weeks 2, 3, 4, 5, 8, 10, 11, 12 ,13, 14 count for 30% of the final grade. Home assignments are due by 1pm, our class time and have to be uploaded on the NYU classes site. No extensions on home assignments. You need to submit your own version and fully understand the solution. No plagiarism, no copying.

Tests & Quizzes

There will a midterm exam, final exam, home assignments and short quizzes. The exam will be held in the classroom, on the scheduled class time, week 8. Final exam will be week 15, at the usual scheduled class time. In lieu of midterm or final there might be a team project assignment.

Recommended Readings

The lecture notes will be posted each week prior to the class. There are some books, which I would recommend (but they are not obligatory)

- *Risk Management (my favorite)*
  - Quantitative Risk Management, concepts, techniques and tools, A. McNeil, R. Frey and P. Embrechts (advanced, theoretical, goes beyond this course)
- *Books on derivatives*:
  - Options, futures & other derivatives, John Hull, Prentice Hall (classic)

- *Stochastic calculus*:
  - Elementary Stochastic Calculus with Finance in View, Thomas Mikosch, World Scientific (nicely written, small introductory book)
- *Data analysis*
  - Statistics and Data Analysis for Financial Engineering, David Ruppert, Springer (nice, practical book, with lot of examples and R code)
- GARP
  - Financial Risk and Regulation Series: Market Risk Management, Credit, Operational and Bank risk management (qualitative , general introduction to various aspects of Risk Management)
- *Additional sources* :
  - I will provide additional references to research papers during the course

Grading of Assignments

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

Assignments/Activities	% of Final Grade
Midterm	[30%]
Final exam	[35%]
Home assignments	[30%]
Participation and quizzes	[5%]

Letter Grades

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

Letter Grade	Points	Percent
A	4.00	Example: 92.5% and higher
A-	3.67	Example: 90.0 – 92.49%
B+	3.33	Example: 87.5% - 89.99%
B	3.00	Example: 82.5% - 87.49%
B-	2.67	Example: 80% - 82.49%
C+	2.33	Example: 77.5% - 79.99%
C	2.00	Example: 70.0% - 77.49%
F	.00	Example: 69.99% and lower

View Grades

Albert

Course Schedule

Topics and Assignments

Week/Date	Topic	Reading	Assignment Due
Week 1, Sep 7 20212	Introduction to Risk Management, calculation of volatility, confidence intervals and distribution tests, Univariate VaR		
Week 2, 3, Sep 14, 21, 2021	Main financial markets and financial instruments	Lecture notes	1,2 assignments are due by 1pm
Week 4, Sep 28 2021	Multivariate distributions, introduction to Normal Mixture Models	Lecture note	3 assignment is due by 1pm
Week 5, Oct 5 2021	Risk factors, stress scenarios and Linear Approximations for Losses	Lecture notes	4 assignment is due by 1 pm
Week 6, Oct 12 2021	Legislative day		
Week 7, Oct 19 2021	VaR by historical simulation, Review before midterm	Lecture Notes	5 assignment is due by 1 pm
Week 8 Oct 26 2021	Midterm	Lecture Notes	
Week 9, Nov 2 2021	Heavy tails distributions, ES and VaR, Coherent Risk Measures	Lecture notes	6 assignment is due by 1 pm

Week 10, Nov 9 2021	Credit analytics, hazard rates	Lecture notes	7 assignment is due by 1 pm
Week 11, Nov 16 2021	Defaultable bonds, introduction to CDS	Lecture notes	8 assignment is due by 1 pm
Week 12 , Nov 23 2021	Merton Model	Lecture notes	9 assignment is due by 1 pm
Week 13 , Dec 7 2021	Portfolio credit risk CVA/DVA	Lecture notes	10 assignment is due by 1pm
Week 15, Dec 14 2021	Final exam		

Course Materials

Required Textbooks & Materials

No required books.

Resources

- **Access your course materials**: NYU Classes (nyu.edu/its/classes)
- **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.