FRE 6131
Clearing and Settlement and Operational Risk

Instructor Information

- Instructor: Professor Roy S. Freedman, Ph.D.
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Course Information

- Course Number: FRE 6131
- Course Title: Clearing and Settlement and Operational Risk
- Course Description:
  This course helps students understand clearing and settlement systems and their associated operational risks.
- Co-requisite or prerequisite: Graduate Status
- Half semester; 2.5 hours per weekly meeting: check Albert for day and time

Course Overview and Goals

This course focuses on issues involved in processing financial transactions--from order execution to final settlement of transactions--and operational risk in general. The course examines the procedures and market conventions for processing, verifying, and confirming completed transactions; resolving conflicts; decisions involved in developing clearing operations or purchasing clearing services; the role played by clearing houses; and numerous issues associated with cross-border transactions. The course also examines the effects of transaction processing, liquidity management, organizational structure, and personnel and compliance on the nature of operational risk. Qualitative and quantitative measures of operational risk are discussed.

Upon Completion of this Course, students will be able to:

- Understand the concepts of payment systems: clearing and settlement.
- Understand the issues involved with bilateral, multilateral, gross and net settlement.

- Understand the tradeoffs between centralized, distributed, and blockchain-based ledgers.
- Learn about the systemically important clearing and settlement providers.
- Understand clearing and settlement risk and Herstatt risk and operational risk.
- Learn how to model operational risk in terms of risk frequency and risk severity.

Course Requirements

Class Participation

Classes consist of lectures, discussion of relevant news, readings, team presentations, and case studies. Each student will be a member of a team. Individual and team assignments will be given. The final team project provides a way for students to present independent research (a review of a financial technology, system, or a case study). Teams will propose a topic, get feedback, and approval, and complete a professional report and formal presentation.

Assignments

Students must submit all of the following deliverables:

1) At least one* optional assignment *per week* (assigned during class). This is due at the next class meeting.
2) Your participation in the team assignments (2-3 team assignments).
3) Your *individual* performance on a surprise quiz.
4) Your team's project proposal – due at least 2 weeks before your presentation at the final meeting (the Class Seminar). The Seminar is open to the NYU community and will be announced at the NYU Tandon Events website.
5) Your team's project Report – due at the Class Seminar.
6) Your team's project Presentation the Class Seminar.
7) Your participation at the Class Seminar.

Tests & Quizzes

There could be one or two surprise quizzes.

Assigned Readings

The reference text for the course is: ***Introduction to Financial Technology*** by Roy S. Freedman, Academic Press, 2006, ISBN: 0123704782. Other material consisting of papers, case studies, and selected news articles are available at the course website: https://inductive.net/fe/6131/6131.htm (password provided in class).

Rules for submission

- Email all deliverables to roy.freedman@nyu.edu .
- Put the text “FRE 6131” in the Email subject line, Email text body, and all attachments so your email will be correctly indexed.
- Insert a <space> between FRE and the course number.
- Identify yourself by name and student number in the email subject line. The email text body, and all email attachments must include the names and student numbers of everyone (such as your team members) who helped you work on the assignment. Identify the assignment name as well.

If these rules are not followed there will be a delay in your grade.

Collaboration is encouraged and required. The class will be broken up into teams. Elect a Team Leader who will be responsible for submitting all team work. Identify the contributors and contributions and the name of the team in the email subject line. As long as all collaborators are listed, only one email need be submitted. Identify all collaborators by name and student number. If these rules are not followed there will be a delay in your grade.

Your expected course participation includes reading the assigned material from the textbook and course website before class. Class participation – questions, comments, observations, and feedback – is highly encouraged. Attendance will be taken.

Project Proposal

The goal of the proposal is to prove that your team can do independent research, and present your results in a professional context. You are free to study any topic of interest to you that is related to the class topics. You can do a book report, an article review, a case study, a detailed description of a financial organization, system, or technology, method, or product. There are many papers you can review that are cited in class (“news”) or cited by the text or that are posted on the course web site. Your work can be a review or a case study of someone else’s work – as long as this is unambiguously identified in your title and your references. For example, “A Review of …. Authored by …”

I will give you feedback on your proposal and help refine the scope of your study. Your proposal must be approved at least two weeks before presentation. Your proposal must include a set of references you will study.

Presentation and Report for Course Seminar

Name of your project should be chosen by your Team – and should be the same as the Team Proposal (see above). The report should be something you can be proud to cite on your

resume and bring to interviews. The report should be at least 6 pages, written professionally, delivered in Word or PDF. It should be a professional review of your study. Make sure that you know the meaning of every word and define every acronym or abbreviation before use. Include page numbers. Formally identify the source of all diagrams, pictures, and quotes. Include a list of references. Include page numbers. Most (at least ¾) of your references should be primary sources – not encyclopedias like Wikipedia (note this). When researching material on the web, use https://scholar.google.com/ for academic papers and legal cases.

The presentation should be something you can be proud to bring to interviews. You should be able to talk about your work for 10-12 minutes. A shorter presentation that covers the major points is better than a longer presentation. *Do not read your report* during the presentation. Most professionals use PowerPoint (a good guideline is 1 minute per PowerPoint slide), but be careful! There are many caveats on using PowerPoint for technical presentations: see point 8 at https://inductive.net/fe/news/FAQ.htm.

For more information:
Consult points 4-10 on https://inductive.net/fe/news/FAQ.htm .

Grading of Assignments

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

Assignments/Activities	% of Final Grade
Proposal for Team Project	50%
Presentation and Report for Course Seminar	10%
Team Assignments	40%

Letter Grades

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

Letter Grade	Points	Percent
A	4.00	92.5% and higher
A-	3.67	90.0 – 92.49%
B+	3.33	87.5% - 89.99%
B	3.00	82.5% - 87.49%
B-	2.67	80% - 82.49%
C+	2.33	77.5% - 79.99%
C	2.00	72.5% - 77.49%
C-	1.67	70% - 72.49%
D+	1.33	67.5% - 69.99%
D	1.00	62.5% - 67.49
D-	.67	60% - 62.49%
F	.00	59.99% and lower

View Grades

Feedback for individual and team deliverables will be provided via email or in class.

Course Schedule

Topics and Assignments

Week	Topics
1	Overview: Payment, clearing, and settlement. Bilateral vs. Multilateral. Gross vs. Net. Centralized vs. Distributed ledgers. Blockchain Technologies.
2	What can go wrong? Clearing and Settlement Risk. Herstatt risk. Multilateral Clearing House Failures: Case Study: Adler Coleman
3	Team Assignment: Systemically Important Financial Market Utilities (SIFMU)
4	Detailed Study of Clearing Architectures via Data Flow Diagrams: DTCC, CHIPS, FedWire.
5	Operational Risk: Basel and IOSCO definitions. The precautionary principle. Modeling Operational Risk: Risk Severity and Risk Frequency. Example: NYSE Special Closings
6	Modeling Operational Risk: Markov Models, Kernel Density Estimation, Archimedean Copulas.
7	Seminar: Team Presentations and Reports.

Course Materials

Textbooks & Materials

- Introduction to Financial Technology by Roy S. Freedman, Academic Press, 2006, ISBN: 0123704782 (Reference).
- Course website: https://inductive.net/fe/6131/6131.htm (password provided in class).

Resources

- **Access your course materials**: NYU Classes (nyu.edu/its/classes)
- **Databases, journal articles, and more**: Bern Dibner Library (library.nyu.edu)
- **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)
- Use **Google Scholar** https://scholar.google.com/ for academic papers, patents and legal cases.

- For your reports and presentations, learn how to use the bibliographic management tools: see https://guides.nyu.edu/citations/tools . I use Mendeley to organize citations, format bibliographies & citations, and more. See https://guides.nyu.edu/mendeley .

Policies

Academic Misconduct

You are not allowed to present other people's work as your own. Summarize in your own words ("paraphrase"), quote, cite, and provide a professionally formatted reference.
Copying violates professional standards. Review the NYU and Tandon Codes of Conduct at

- https://engineering.nyu.edu/sites/default/files/2018-06/code-conduct2-2-16.pdf
- http://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/educational-and-research-uses-of-copyrighted-materials-policy-st.html

For more information: Consult point 5 on http://inductive.net/fe/news/FAQ.htm .

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 has 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. . Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

Syllabus 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.