Electronic Trading in Financial Markets
Tentative Syllabus for Fall 2021
MBA and EMBA classes, Columbia Business School
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Overview:
Students will investigate the forces that influence the creation, development, and evolution of financial market systems and electronic trading to understand the role financial technology (FinTech) will play in the future of capital markets.

The course will begin with an introduction to the foundational basics of markets systems, mechanics of traditional sales and trading, and the concept of market liquidity. Students will then progress to learning about the role of technology in financial markets, the mechanics of electronic trading, and current technology-driven trading strategies like high-frequency trading. The final section of the course will cover the growth of electronic trading in fixed income, and conclude with an examination of the platform building process in capital markets.

Approach:
Electronic Trading in Financial Markets will primarily be taught through live demonstrations, group discussions, role playing, and the incorporation of guest speakers. There will be an emphasis on comprehensive, multimedia learning materials including podcasts.

Grades:
An individual student’s performance will be measured through a combination of weekly proficiency tests, in-class participation, an individual report, and a group project/presentation.

Curriculum Outline:

Class 1 - Foundational Capital Market Structure
The first class is a review of the roles and functions of each participant group, the basic workflow of securities trading, and a discussion on the core market structure concepts that influence and change market development. Finally, this introductory class asks one of the most important questions in financial market structure: What is Liquidity? Students will be introduced to a theory on liquidity that will be applied to both financial and non-financial markets. The conclusion of this session will articulate the key elements that directly control market evolution.

Class 2 - Evolution of Capital Markets Technology Systems
What are the key technology systems and solutions that dominate capital markets today? What do they do? How did they develop? This class will teach the history and key milestones of capital markets technology systems to help students understand what has shaped the current landscape and what new ideas will most likely take form in the future.

Class 3 - Fundamentals of E-Trading - The Electronic Order Book
This class is designed to help students master the basics of electronic trading by reviewing the history of the most dominant electronic trading protocol in capital markets, the electronic order book. Students will be presented with a full demo of a working electronic order book and a map
of which areas of capital markets have adopted the protocol. The session concludes with a key discussion on the environmental conditions necessary for the successful adoption of electronic order book trading.

**Class 4 - Algorithmic Trading**
This session is focused on the evolution of algorithmic and high-frequency trading techniques in capital markets. How did automated trading develop and what is their relationship to ‘Flash’ crashes and rallies? Students will be asked to debate a key question: Is high-frequency trading good or bad for capital markets?

**Class 5 - Advanced Electronic Trading**
This class will articulate the mechanics of electronic trading across different asset classes, with emphasis on fixed income markets. Students will learn the workflows for common electronic trading protocols like, click to trade, dark-pools, and request for quotes (RFQs).

**Class 6 - Platform Building**
This class will review the development of three key capital markets platforms: MarketAxess, BondBook, and BondCliQ. Students will learn the building blocks of creating a market solution and the common obstacles to innovating in capital markets.

**Method of Evaluation**
The course grade will be based on class participation, cases, a final exam, and final group project. The components of the grade are as follows:

- **Class Participation**: 30%
- **Cases**: 40%
- **Final Group Project**: 30%

**Class Participation**: Class attendance is mandatory. Students will be graded on attendance, responsiveness, and overall contribution to the collective class learning experience.

Successful participation includes: (1) being on-time to class and upon return from breaks, (2) being particularly respectful and prepared with thoughtful questions when guest speakers are present, (3) not using electronic devices, in particular, phones during class time. Laptops may be used for taking notes but nothing else, unless instructed.

Students are responsible for material covered during classes they may have missed. Classes may be videotaped for later viewing.

Missing three sessions (50% of the classes) will lead to an incomplete grade for the class.
**Cases:** There will be 3 cases. Each case is accompanied by a set of questions to be answered in a formal document, written by the group. This document must be handed in at the beginning of class in which the case is discussed (weeks 2 thru 5). The total grade for each group will be the average of the three cases.

**Final Group Project:** Each group will design, write and produce a podcast episode on a topic related to electronic trading. The final, completed podcast is due at the end of the course (conclusion of week 6).

Full Class Summary:

**Class 1**
Foundational Capital Market Structure
   a. Basic Mechanics of Sales and Trading
      i. Presentation
   b. De-Mystifying Liquidity
      i. Presentation
   c. Theory of Transaction Frequency
      i. Presentation

Required Reading/Content Consumption
   1. Making Markets - Opportunism and Restraint on Wall Street - Intro & Ch 1-3
   2. The Cost of Transacting (Harold Demsetz) - pg 33-46

Assignment (due in class)
   ● Write a summary explaining the trading workflow for the following scene in Trading Places - [https://www.youtube.com/watch?v=-4_fwzC4PNI](https://www.youtube.com/watch?v=-4_fwzC4PNI)
      a. These will be read and discussed in class

Class will be divided into working groups for case studies and final project
   ● First case study - What assumptions did Fisher get right and wrong in Towards an Automated Exchange?
      ○ Short essay with powerpoint presentation for next class

Suggested Reading: Reminiscences of a Stock Operator

**Class 2**
Evolution of Technology Systems
   d. History of Financial Market Technology
      i. Presentation
   e. Bloomberg Terminal
i. Demonstration
f. Presentation and discussion of case study answers

Required Reading/Content Consumption
3. Ascent of Money - Ch TBD
4. Plundered by Harpies: An Early History of High-Speed Trading
5. Towards an Automated Exchange - Parts 1 & 2

Assignments for next week
- Case Study Questions - TBD
  a. Did electronic trading contribute to the 1987 crash, if so, how?
  b. How did the 1987 crash influence the development of electronic trading in equity markets?
- Finalized podcast topics

Class 3
Fundamentals of Electronic Trading
  g. Mechanics of an Electronic Order Book
     i. Presentation
  h. Guest Speaker - Jamie Selway
     i. Students present finalized podcast topics
     j. Students present case study answers

Required Reading/Content Consumption
  6. The Ecology of an Order-Drive Market
  7. A Brief History of the 1987 Stock Market Crash with a Discussion of the Federal Reserve Response

Assignment for next week
- Working Group Debate
  a. Is high-frequency trading good or bad for market structure?

Class 4
Algorithmic Trading
  k. Mechanics of Algorithmic Trading
     i. Presentation
  l. Guest Speaker - Jamie Selway
     m. Student debate on HFT

Required Reading/Content Consumption
  8. Equity Trading in the Fast Lane: The Staccato Alternative
  9. Dark Pools - Selected Chapters
10. A Sociology of Algorithms: High-Frequency Trading and the Shaping of Markets

Suggested Reading: Flash Boys

Assignment for next week
- Case Study Questions TBD (Intervest related)
- Podcasts must be completed by next week

Class 5
Advanced Electronic Trading
- Electronic Trading in Fixed Income
  - Presentation
- Guest Speaker - Larry Fondren
- Students present case study answers

Required Reading/Content Consumption
12. Electronic Trading Systems and Fixed Income Markets

Assignment for next week
- Present final project podcasts
- Listen to all class podcasts

Class 6
Platform Building
- BondCliQ Investor Pitch
  - Presentation
- Students present podcasts - 10 min Q&A after each presentation

Required Reading/Content Consumption
13. BondCliQ Seeks to Change the Way Corporate Bond Market Trades
14. Moneyball for Bonds Aims to Rank Traders Baseball Card Style
15. Autonomous Conference Presentation – The Link Between Transparency and Market Liquidity
17. Minority-Owned Dealers Get a Way to Be Seen on Wall Street
18. Brief demo of BondCliQ data visualization system

Connection to the Core
Electronic Trading in Finance builds on the knowledge from Capital Markets and Investments by advancing students’ understanding of investing mechanics, investing technology, and fixed income market evolution. Electronic Trading builds on the basic investing and product fundamentals in Capital Markets to provide details on how the trading process, human behavior, and regulatory mandates are influenced and impacted by technology.