SYLLABUS

August 8, 2026

Course code / -title: FIN11 Trading and Market Microstructure

Program of study: Bachelor

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Department: Finance

Semester: Fall 2026

Teaching language: English

Credits: 7.5

Notes:
1. Slides and online material will be available at the Canvas web site of FIN11. Trading data and the code used to analyse these data can be found at www.schenk-hoppe.net/NHH/. Try to come to the lectures prepared to allow for more interactive teaching and discussions! All reading is ideally done twice: First time before class and second time after class.
2. Attending the trading sessions as well as the presentations by guest speakers is compulsory.
3. The timetable requires a little attention than usual due to its non-standard structure.
4. We have Auditorium B (Aud B) 75% of the time. Please check the displays before each session.

Assessment:
One written note (2,500-3,000 words, teams of up to 2 students), contributing 30% to total mark.
One term paper (maximum 6,000 words, teams of up to 4 students), contributing 70% to total mark.

Instructions on writing note (30% of total mark): Describe your experiences with an interactive trading session. The written note requires you to explain the trading setup, the main task, your expectations and approach as well as the lessons learned in the fourth trading session (around 1,000-1,500 words) and, in addition, to offer insights on one or more aspects related to our trading session (around 1,000-1,500 words), e.g., price efficiency, trading costs, liquidity, order choice and order aggressiveness, or inventory management. A good note requires you to evaluate your behavior, critically reflect on your trading skills, to explain to the reader why you did/did not succeed in solving the trading task in the session and to study one aspect of the market dynamics using the data. The note has to be written in English. Students should organize themselves in teams of 2 members for the purpose of this assignment.

Instructions on writing term paper (70% of total mark): Select a trading topic of your choice. A good term paper uses the material in the textbook to analyze a topic (or question, issue, event) that is not explicitly dealt with in the book. The term paper has to be written in English. Students should organize themselves in teams of up to 4 members for the purpose of this requirement. Past term papers are made available. These also serve as additional reading (see end of this document).

Session 1: August 17, 12-14 (Aud B)
Introduction (Motivation, overview of topics, trading sessions, guest speakers, assessment)
Reading: Harris (2003) Chapters 1-3, FTS Student Manual, Harris (2015) Chapter 1, Lehalle/Laruelle (2018) Forewords and Prefaces, Bouchaud et al. (2018) Chapter 1.

Session 2: August 17, 16-18 (Aud B)
Orders (Trade instructions in the absence of direct negotiations, limit-order books, order types)
Reading: Harris (2003) Chapter 4, Bouchaud et al. (2018) Chapters 3-4.

Session 3: August 18, 12-14 (Aud B)
Stock exchanges (Trading sessions, call auctions, continuous trading)
Reading: Harris (2003) Chapter 5-6.

Performance and evaluation of traders (Overview and discussion)

Session 4: August 18, 16-18 (Aud M)
Trading session 1 (Bring your laptop. Short introduction to software, practice session trading in limit-order markets) Data will be made available later that day; work with these to practice for assignment!
Reading: Harris (2015) Chapter 4, FTS Student Manual.

Session 5: August 24, 12-14 (Aud B)
Financial products: Uses and abuses (Short-selling, futures, options, hedging, HFT, IEX, dark liquidity, and more on markets)

Session 6: August 24, 16-18 (Aud B)
Review of Trading session 1 (in Session 4)
Benefits of trade (Why people trade, good markets, some thoughts on regulation)
Reading: Harris (2003) Chapter 8-9, Harris (2015) Chapter 2.

Session 7: August 25, 12-14 (Aud B)

Automated trading (Overview, algorithmic trading, automated market-making, risks in automation, flash crash, high-frequency trading)
Reading: Harris (2015) Chapter 5, Harris (2015) Appendix A, Lehalle/Laruelle (2018) Chapters 2-3.

Session 8: August 25, 16-18 (Aud M)
Trading session 2 (Bring your laptop. Order-driven markets with private information: Introduction, allocation of individual trading tasks, news and expectations, performance evaluation, interactive trading) Data will be made available later that day; work with these to practice for assignment!
Reading: Harris (2015) Chapters 3 and 4.

Session 9: September 7, 12-14 (Aud B)
Dealers (Introduction, market making, bid-ask spread)
Reading: Harris (2003) Chapters 13-14, Harris (2015) Chapter 2.4, Bouchaud et al. (2018) Chapter 17.

Session 10: September 7, 16-18 (Aud B)
Trading session 3 (Bring your laptop. Multi-asset order-driven markets with private information: Introduction, allocation of individual trading tasks, news and expectations, performance evaluation, interactive trading) Data will be made available later that day; work with these to practice for assignment!
Reading: Harris (2015) Chapters 3 and 4.

Session 11: September 8, 12-14 (Aud B)
Presentation by Jan Magne Lauritzen, DNB, Dealer, FX & Derivatives (Foreign exchange market, market making, leverage, role of latency, automated risk and trading solutions)

Session 12: September 8, 16-18 (Aud M)
16-17 Review of Trading in Sessions 8 and 10, including discussion useful for first assignment
17-18 Open outcry market session

Session 13: September 14, 12-14 (Aud B)
Presentation by James Hall, London, Senior trader (Bank, Prop market, Hedge fund,...)

Session 14: September 14, 16-18 (Aud B)
Trading session 4 (Bring your laptop. Dealer market, the role of asymmetric information, allocation of individual trading tasks, performance evaluation, trading session) Data available later that day, work with these in your assignment!
Reading: Harris (2015) Chapter 3-5.

Work on first assignment commences (2,500 - 3,000 words). Submission via WiseFlow by September 30, 12 noon.

Session 15: September 15, 12-14 (Aud B)
Presentation by Peder Viervoll, NBIM, Head of Quantitative Trading, New York. (The buy-side, trading from the perspective of a very large investor, recent developments in market structure.)

Session 16: September 15, 16-18 (Aud M)
Informed traders (Overview, information and news, market efficiency, price discovery, thoughts on liquidity and information)
Reading: Harris (2003) Chapter 10, Harris (2015) Chapters 2.2 and 3.

Meetings to discuss your ideas for the term paper commence.

Session 17: November 2, 12-14 (Aud B)
[TBC] Presentation by Léa Poli, former FIN11 student, European Government Bond Trader, London. “My life as a trader in the fixed income world.” Selected students are invited for dinner with the speaker.

Session 18: November 2, 16-18 (Aud B)
Parasitic traders (Overview, front running, quote matching/penny jumping, squeezing, bluffing, market manipulation, more thoughts on HFT.)
Reading: Harris (2003) Chapter 11-12, Harris (2015) Chapters 2.3 and 6.8, Lehalle/Laruelle (2018) Chapter 2.4.

Session 19: November 3, 12-14 (Aud B)
Kyle model of strategic trading.
Reading: Albert S. Kyle (1985) Continuous Auctions and Insider Trading, Econometrica Vol. 53: 1315-1335, Bouchaud et al. (2018) Chapter 15.

Session 20: November 3, 16-18 (Aud M)
Wrapping up and discussion of past term papers and ideas for topics for future term papers. (Summary of course, a little about my current research on market microstructure. Regulation: short-selling bans, leverage, financial transaction taxes)
Work on term paper commences (maximum 6,000 words). Submission via WiseFlow by December 7, 12 noon.

Online meetings to discuss your term paper offered until mid November.

Required literature:

- Harris, Larry, Trading and Electronic Markets: What Investment Professionals Need to Know, CFA, Research Foundation Publications, 2015. Available for free at: https://www.cfainstitute.org/en/research/foundation/2015/trading-and-electronic-markets-what-investment-professionals-need-to-know

- Harris, Larry, Trading and Exchanges, Market Microstructure for Practitioners, Oxford University Press, 2003.

- Lecture slides, available in advance via FIN11's Canvas page

- Trading data and R code, available via lecturer's webpage www.schenk-hoppe.net/NHH/

- Financial Trading Systems (FTS) Student Manual and information about trading on their webpage http://www.ftsmodules.com/ (go to the bottom of the page). In particular read the Student Manual www.ftsmodules.com/public/modules/trader/StudentPrepFTSInteractiveMarketCases.pdf

Recommended literature:
Scientific (ordered by readability)

- NBIM, High Frequency Trading - An Asset Manager's Perspective, Discussion note 01|2013.

- NBIM, Sourcing Liquidity in Fragmented Markets, Discussion note 01|2015.

- NBIM, Portfolio Delegation and the Effects of Benchmarks, Discussion note 01|2020.

- Jiang, Hao, Yong Ma and Tianyang Wang, Too Many Irons in the Fire: The Impact of Limited Institutional Attention on Market Microstructure and Efficiency, Journal of Financial Markets, 2025, Vol.73, Article 100969.

- Lehalle, Charles-Albert and Sophie Laruelle, Market Microstructure In Practice (2nd ed.), World Scientific, 2018. An easy read! From the cover: "This book exposes and comments on the consequences of Reg NMS and MiFID on market microstructure. It covers changes in market design, electronic trading, and investor and trader behaviors. The emergence of high frequency trading and critical events like the"Flash Crash" of 2010 are also analyzed in depth. Using a quantitative viewpoint, this book explains how an attrition of liquidity and regulatory changes can impact the whole microstructure of financial markets. "

- Bouchaud, Jean-Philippe, Julius Bonart, Jonathan Donier and Martin Gould, Trades, Quotes and Prices: Financial Markets Under the Microscope, Cambridge University Press, 2018. Two of the authors are with Capital Fund Management, Paris. I found it fun to read (with plenty of references). It is only a little bit technical and data-driven.

- de Jong, Frank and Barbara Rindi, The Microstructure of Financial Markets, Cambridge University Press, 2009. Only for those with a knack for mathematical/quantitative modeling. The book is praised by Albert S Kyle, the father of market maker models, whose endorsement contains the words: "a clear and accessible discussion of market microstructure

[...] that will prove very useful to both Ph.D. level students and MBA level students."

- Hasbrouck, Joel, Empirical Market Microstructure: The Institutions, Economics, and Econometrics of Securities Trading, Oxford University Press, 2007. Technical and a challenge. Recommended to those students who would like to specialize in the area and write a technically demanding BSc or MSc dissertation.

- Foucault, Thierry, Marco Pagano and Ailsa Röell, Market Liquidity: Theory, Evidence, and Policy, Oxford University Press, 2013. Easy to read and very informative. Written by experts. (Used as main textbook on NHH's MSc course FIE 447.)

- Easley, David and Maureen O'Hara. Market Microstructure Theory, Wiley, 1995. Focusses on dealer/market-maker markets. A classic but quite dated by now. Written by the most cited financial economists in market microstructure.

- Harris, Larry, What to Do about High-Frequency Trading, Financial Analysts Journal, March/April 2013, Vol. 69, No. 2: 6–9.
  A short paper summarizing the current issues related to high-frequency trading (HFT) where milliseconds matter. Harris' balanced view of the topic provides a good starting point by focusing on the bigger picture. A less balanced, supplementary reading is Dennis Dick's comment "An Ugly High-Frequency Mess", CFA Magazine, January/February 2013, Vol. 24, No. 1: 24–25.

- Madhavan, Ananth, Exchange-Traded Funds, Market Structure, and the Flash Crash, Financial Analysts Journal, July/August 2012, Vol. 68, No. 4:20-35.
  Ask any trader about 6 May 2010, and they will immediately recall what they did on that day. The paper gives a clear picture of the flash crash in context of the interplay between trading, market structure, and HFT as well as some theory and some empirics.

- Kyle, Albert S., Continuous Auctions and Insider Trading, Econometrica, 1985, Vol. 53: 1315-1335. See also Bouchaud et al. (2018) or de Jong and Rindi (2009).

Non-scientific but excellent background reading:

- Lefèvre, Edwin, Reminiscences of a Stock Operator, Wiley 2006, first published 1923. Annotated edition by Jon D. Markman.
  This is the classic autobiography of Jesse Lauriston Livermore (1877-1940). Livermore starting trading in New England "bucket shops" at the age of fourteen, and made and lost several fortunes during his career as a speculator. This book is a delightful read about his personal experiences with many of the trading issues that we will study in this course.

- MacKenzie, Donald, Trading at the Speed of Light: How Ultrafast Algorithms Are Transforming Financial Markets, Princeton University Press, 2021.
  The publisher praises the book as "A remarkable look at how the growth, technology, and politics of high-frequency trading have altered global financial markets." and "HFT has brought new efficiency to global trading, but has also created an unrelenting race for speed, leading to a systematic, subterranean battle among HFT algorithms."

- Lewis, Michael, Going Infinite: The Rise and Fall of a New Tycoon, Norton 2023.
  The publisher praises the book as "Sam Bankman-Fried wasn't just rich. Before he turned

thirty he'd become the world's youngest billionaire, making a record fortune in the crypto frenzy. CEOs, celebrities and world leaders vied for his time. At one point he considered paying off the entire national debt of the Bahamas so he could take his business there. Then it all fell apart."

- Lewis, Michael, Liar's Poker, Norton 1989.
  This book describes the experiences of the author as a recruit and bond seller with Salomon Brothers during the late 1980's - an important period in the history of Wall Street. It is a vivid account of the culture, or lack of it, on the bond trading floor, and the cynicism with which the firm's customers were treated. Today, with the recent financial crisis fresh in mind, this book foreshadows the mentality and the "financial weapons of mass destruction" that made things the worst since the Great Depression.

- Lewis, Michael, The Big Short: Inside the Doomsday Machine, Penguin, 2011.
  The publisher praises the book as "From the jungles of the trading floor to the casinos of Las Vegas, The Big Short, Michael Lewis's No.1 bestseller, tells the story of the misfits, renegades and visionaries who saw that the biggest credit bubble of all time was about to burst, bet against the banking system - and made a killing." Maybe you want to watch the movie first.

- Lewis, Michael, Flash Boys, Norton 2014.
  From the cover: "*Flash Boys* is about a small group of Wall Street guys who figure out that the U.S. stock market has been rigged for the benefit of insiders and that, post–financial crisis, the markets have become not more free but less, and more controlled by the big Wall Street banks. Working at different firms, they come to this realization separately; but after they discover one another, the flash boys band together and set out to reform the financial markets. This they do by creating an exchange in which high-frequency trading—source of the most intractable problems—will have no advantage whatsoever."

- Patterson, Scott, The Quants: How a New Breed of Math Whizzes Conquered Wall Street and Nearly Destroyed It, Crown Business 2010 (paperback 2011).
  An insightful and entertaining narrative of the role of quants in the build-up of risk that contributed to the financial meltdown in 2007/8.

- Patterson, Scott, Dark Pools: The Rise of the Machine Traders and the Rigging of the U.S. Stock Market / Dark Pools: The rise of A.I. trading machines and the looming threat to Wall Street 2012 (paperback 2013).
  Enjoyable book on financial markets. From the cover: "A news-breaking account of the global stock market's subterranean battles, *Dark Pools* portrays the rise of the "bots"-artificially intelligent systems that execute trades in milliseconds and use the cover of darkness to out-maneuver the humans who've created them."

- Patterson, Scott, Chaos Kings: How Wall Street Traders Make Billions in the New Age of Crisis, Scribner Book Company 2023.
  Aaron Brown, formerly with AQR Capital Management, comments: "Fast paced like a thriller but, also, thought-provoking in its willingness to show us the range of possible catastrophes, Chaos Kings tracks the adventures of contrarian investors who, rather than hide from chaos and confusion, seek it out. Their reward in many cases: a fortune. This book teems with great stories as well as market insights that you won't get from conventional investors."

- Stevenson, Gary, The Trading Game, Allen Lane 2024.
  "[...] darkly funny book that makes a convincing case that high finance is as toxic, reckless

and deeply cynical as ever." says the Guardian, and "Stevenson is a sharp observer, with a gift for colourful if merciless description… His breakdown started with trading mania and ended with his exile to the Tokyo office, pleading to be allowed to leave. His bonuses had brought him torment, not freedom." says the Financial Times. Gary runs a Youtube channel https://www.youtube.com/@garyseconomics.

Movies/Documentaries

- Wall Street (1987), Dealers (1989), Boiler Room (2000), Inside Job (2010), The Pit (2010, doc), Quants: The Alchemists of Wall Street (2010, doc), Margin Call (2011), Too Big to Fail (2011, doc), The Wolf of the Wall Street (2013), The Big Short (2015), Equity (2016), The Wizard of Lies (2017), Billions (Netflix series, 2016–), Madoff: The Monster of Wall Street (Netflix series, 2023).

Selected past Term papers as reading (available on course website, see above)

2025 term papers (graded A)
Activist Short Selling and its Impact on Stock Prices: An Event Study Analysis of Market Reactions to Hindenburg Research Reports
Diving Into the World of Sin Stocks: Financial Greed and Moral Decay
Leveraged ETFs as Trading and Investment Vehicles
Sindre Finnes: Trying to Beat the Market
The Holiday Effect On The Oslo Stock Exchange: When Analysts Leave For The Holidays
Trading in European Carbon Allowances - Information Efficiency and Short-Run Trading Opportunities in EUA Contracts
When Insiders Buy… Should We? - Evidence From Sweden

2024 term papers (graded A)
Retail Trading and Option Mispricing
Testing the Trend Factor: Applications Across Asset Classes
Diving Into the Deep: How Dark Pools Effect*[sic]* Price Volatility in Financial Markets

2023 term papers (graded A)
Heimstaden – Too big to fail [not available due to NDA on interviews]
Investing in Happiness
Market Manipulation on the Oslo Stock Exchange
Merger Arbitrage - Unlocking Possibilities for Excess Returns in Cash Deals
Tesla Stock Trading Based on Elon Musk's Tweets
The Rise and Impacts of Zero Days-to-Expiration Options

2022 term papers (graded A)
Insider trading in Capitol Hill: Investigating insider trading among the members of the U.S Congress
Hedging the Wheat Market: How can Norgesmøllene hedge against international wheat price fluctuations, and how does this affect their costs?
Prison Stocks - Capitalizing on Inflation, Crime and Political Uncertainty

2021 term papers (graded A)
Sustainable Investment in Times of COVID-19
Coffee Price: Influencing Factors and Hedging Strategies
GME's short squeeze - How David challenged Goliath and won

Pairs Trading with Russian Oil: A hidden arbitrage opportunity?

2020 term papers (graded A)
Algorithmic Trading
Surging IPO Market
Index Inclusion and Stock Performance
Hedging Weather Risk with Options
In the Footsteps of Einar Aas: Trading the Spread Between Nordic and German Power Futures Contracts [not available due to NDA on data used]

2019 term papers (graded A)
Capitalizing on the overnight gap on Oslo stock exchange
Analysing the profitability of cum-cum trading on the Norwegian stock exchange
An inquiry into the nature of the Australian water market
Should Institutional Investors include a Gold ETF in Their Portfolio?

2018 term papers (graded A)
Hedging applied in the airline sector. How can airlines hedge against fuel price risk?
Making money with IPOs
Volatalia: Option Trading Strategies for the Italian Yield Curve
The Currency Carry Trade
Robinhood: Helping out the little guy or in cahoots with the sheriff?
Estimating the Returns of Legal Insider Trading on the Oslo Stock Exchange

2017 term papers (graded A)
Group 4, Comparing returns between Norwegian actively and passively managed mutual funds
Group 5, In the Money, Out of the EU. Using a Neutral Options Volatility Strategy on the British EU-Referendum
Group 6, The Average Compounded Growth Rate Model
Group 7, Pairs Trading in the U.S. Defense Industry
Group 8, Trading on Trump's Tweets
Group 11, IPO Trading Strategies

Pre-2017 term papers (any grade)
The Dark Pool's Effect on Price Discovery
Essay on Hedging Terrorist Attacks
Building a US Election Portfolio - Based on the Expected Financial Impact of the Election
The DAX-Index
The Modern Intelligent Investor: Simple, Algorithmic Strategies to Produce Market-Beating Returns
Essay on Turtle Trading
IEX as a Market Based Solution to Buy-Side Investors and the Future of Global Market Microstructure
The Business Model of IEX
Algorithmic trading
The Significance of High Frequency Trading on Financial Markets
The Burst of Trading through Technology
Essay on how HFT affects market quality
New Evidence for the January Effect: A Market Size Question
Essay on HFT and Flash Crash
The Flash Crash
Bad weather - Bad business? Weather effects on the German stock market
High Frequency Trading and Front Running

Pairs Trading and the impact of a merger
Implementing a pair trading strategy in the Norwegian seafood industry”
Pairs Trading
Potential Trends on the Oslo Stock Exchange
A Statistical Analysis of the Small Firm Effect in the 21 Century - Does Size Matter?
Implementing a Market Neutral Trading Strategy to Norwegian Salmon Stocks
Analysis of the impact of MiFID II on financial institutions
Lessons in trading best practices from the aftermath of the Brexit referendum