FIN 611- Introduction to Topics in FinTech Syllabus

Spring 2024

Course Modality:

This is an online course, which will be conducted fully online, asynchronously via Canvas. For more information on using Canvas and other supported learning tools, visit the IST Service Desk Knowledgebase.

Instructor Information

Instructor	Email	Office Hours
Ajim Uddin, PhD	au76@njit.edu	Office: CAB 2016 Office Hours: M 4:00-6:00 PM or by appointment WebEx

I will respond to all emails/Inbox messages within 48 hours. Assignments, discussions, and project deliverables will be graded weekly.

TA information:

Muntasir Shohrab

Email: ms3235@njit.edu

Webex or by appointment: Office: CAB 2018

Office Hours: Tuesday 12:00-1:00 pm or by appointment

General Information

Course Description

The financial services industry is presently undergoing dramatic changes as recent technological advances have enabled the automation of former workflows. This course will survey current trends in the Financial Technology (FinTech) industry. Students will have the opportunity to develop their own software related to FinTech ideas discussed during this course.

Prerequisites/Co-requisites

Students must have taken an introductory programming course prior to enrolling in FIN 611 that concentrated on learning at least one of Python, Java, MATLAB, C/C++, or R.

Course Learning Outcomes

By the end of the course, you will be able to:

1. Analyze FinTech data using tools such as Python and Python libraries.
2. Identify key disruptions that have led to the current FinTech industry landscape.
3. Evaluate current state-of-the-art FinTech Techniques.
4. Analyze the current state of FinTech, FinTech risk, and policy implications.
5. Write a research paper that has the potential to publish in a peer-reviewed journal.
6. Synthesize algorithms and data from different sources to produce business results and knowledge.

Required Materials

For the case study, you will need to create an account to Harvard Business Publishing and access the FIN 611 Coursepack. You may need to purchase the cases with a nominal fee ($5-10).

Recommended Materials

In this course we will mainly review articles and news. Therefore, books are not required, rather recommended:

- An open source book that thoroughly discusses deep learning techniques along with python implementations. A great book if you are interested in deep learning: Aston Zhang, Zack C. Lipton, Mu Li, Alex J. Smola: Dive into Deep Learning
- This is the best book that explains how things actually work in the five financial functions. Randall E. Duran: Financial Services Technology: Processes, Architecture, Solutions
- James Haycock and Shane Richmond: Bye Bye Banks?: How Retail Banks are Being Displaced, Diminished and Disintermediated by Tech Startups and What They Can Do to Survive(Available on Amazon for $6).

Course Readings:

Please see both Canvas and the syllabus below for required reading. You may have to access the reading yourself in Canvas (PDF) or via a syllabus link. You are responsible for all the indicated readings. Because fintech is evolving rapidly, I will occasionally post additional readings or links via announcements.

Grading Policy

NJIT Grading Legend

Final Grade Calculation

Final grades for all assignments will be based on the following percentages:

Class Participation (Discussion Forums and Reflections)	**25%**
Presentations	**15%**
Case Study Questions	**10%**
Individual Homework Assignments	**10%**
Research Paper (Proposal = 10%, Milestone Report = 5%, Presentation 5%, and Final Paper = 20%)	**40%**

In addition, you will have the opportunity to complete Bloomberg Certification as part of this course; if this is completed, your final grade will increase by 5%.

Course Work

Class participation/Discussion Forums: (25% of grade) You are expected to participate in weekly discussion forums in Canvas. The idea is to create an in-person class-like environment, where we refine our understanding on a topic by discussing and debating with our peers. When all students participate in a discussion, it creates an active learning environment that will help you better understand the materials and be more successful in the class. You will post your initial response to the prompt by Fridays at 11:59pm and respond to at least two classmates by Sunday at 11:59pm of the week they are listed.

Presentation: (10%+5% of grade) Students are required to do one individual presentation on a scholarly paper. Students can choose the paper they wish to present from the reading list. Note that from the reading list, only published scholarly papers are eligible for presentation. Subject to prior approval, students can present a paper that is not on the reading list but is relevant to the studied topic in the class. You will be graded on your understanding of the paper, successfully explaining the idea to your classmates, identifying the limitations of the paper, and suggesting possible extensions/future research directions.

Everyone also expected to read the presented papers and engage in meaningful discussion. 10% of your grade is based on your presentation, and 5% will be determined based on your discussion and response to others' presentations.

The presentation assignments will be facilitated with a tool called VoiceThread. For guidance, please see VoiceThread's documentation on how to comment and how to add slides. You may find their guide Getting around in VoiceThread helpful as well.

Individual Homework Assignments: (10% of grade) Assignments will be given weekly to give you an opportunity to apply course concepts for that week. These activities are designed to help you practice and prepare for the projects.

Case Study Questions (10%):
This class includes multiple case studies. Case question write-ups should use analytical writing. Qualitative work requires strong logical reasoning. The following general outline is useful: hypothesis or research question/statement, data, evidence, argument (including rebutting the counter argument), limitations, and conclusions. Students will work in groups to solve the cases. The Fintech Cases and the group exercises will prepare you for an applied understanding of Fintech in the real world. The case assignments will be posted in Canvas.

Research Paper: (**40% of grade**) There is one individual project with four deliverables. You will have opportunities to iterate and revise your work based on peer and instructor feedback.
Deliverables one (Week 6): Project Proposal.
Deliverables two (Week 10): A draft report including your progress on the project.
Deliverable three (Week 14): A 10-minute presentation of your project.
Deliverables four (Final Week): Complete Research Paper.
The learning outcomes of the research project are: .

- Research a topic relevant to the field of FinTech.
- Demonstrate understanding of research methods.
- Learn how to systematically approach a problem to find a solution and implement your idea/solution in a programming language e.g. Python.
- Write a research paper that has a potential to publish in a peer reviewed journal.

Details about the project will be provided separately in Canvas.

Bloomberg Certification (Bonus 5%): Bloomberg Market Concepts (BMC), also known as Bloomberg Certification, is a self-paced e-learning course that provides a visual introduction to financial markets and the core functionality of the Bloomberg terminal. It takes ~8 hours to complete and progress is saved automatically. After finishing BMC, Bloomberg provides a "Certificate of Completion". You can have free access to Bloomberg terminals on the first floor of the library building at "Ray Cassetta Financial Analysis Lab." The TA in the lab can help you create a Bloomberg account to get started with the Bloomberg certificate.
By completing this certificate, you will learn how to use the Bloomberg terminal to access financial data. It will also help you expand your financial market knowledge and conduct

further research using the Bloomberg Terminal. Plus, it is a great professional certificate to add in your CV.

If you can't make it to the campus for using the "Ray Cassetta Financial Analysis Lab" you can use the Bloomberg Online Certification. The BMC is available online for a student rate of $149 USD (professional rate of $249 USD). You can sign up for BMC online access here.

For more details please visit Bloomberg Official Page.
In order to receive the bonus points, you need to upload the "Certificate of Completion" in canvas.
NOTE: The Lab TA is assigned each semester. As we move closer to the semester we would know the exact person. Most likely he/she will be more than happy to consult a one-to-one webex meeting to explain bloomberg. I will share the TA information during the semester.

Feedback

All assignments and projects deliverables will be graded weekly. Students will receive feedback on each assignment using the comments feature in Canvas.

Letter to Number Grade Conversion

Exam Information and Policies

This course does not have any exams. Per the NJIT Online Course Exam Proctoring Policy, this course will use authentic assessment, meaning you will be assessed and graded on your ability to deliver real-world outputs as well as your participation and feedback to other students.

Policy for Late Work

All assignments/projects are expected when due, as stated in your syllabus. Except for valid reasons for late assignments, you will be penalized accordingly: For the first day, you will be penalized 40% of your total point. You will be penalized 20% of your points for each additional day. If you are late for more than four days, you will receive 0 points.

Academic Integrity

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the NJIT academic code of integrity policy.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the

university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"

Netiquette

Throughout this course, you are expected to be courteous and respectful to classmates by being polite, active participants. You should respond to discussion forum assignments in a timely manner so that your classmates have adequate time to respond to your posts. Please respect opinions, even those that differ from your own, and avoid using profanity or offensive language.

Weekly Expectations

This course is organized by weekly modules. Each week, students must watch lecture videos, complete reading assignments, and participate in a class discussion forum by Friday at 11:59 pm (Note: responses to classmates are due by Sunday at 11:59 pm). If a week includes a student presentation, the presentation is due by Friday at 11:59, and responses to the presentation are due by Sunday at 11:59 pm. In addition, students are also expected to finish and submit their homework assignments by Sunday 11:59 pm.

Course Schedule

Week	Topic	Reading	Assignment/Due Dates
1	Course Introduction: The Fintech Opportunity	1. The Economist, To Do With the Price of Fish 2. Bodie, Zvi, and Merton, Robert C. 1998. A Conceptual Framework for Analyzing the Financial Environment (Presentation). 3. Citi GPS, 2016, Digital Disruption: How FinTech Is Forcing Banking to a Tipping Point. 4. Philippon, Thomas. 2018. The Fintech Opportunity. NBER Working Paper. (Presentation). 5. NFT Explained 6. Get Started with Bloomberg Certification	1. Introduce Yourself 2. Module 1 Discussion 3. Module 1 Reflection **Due 1/22**
2	Introduction to Machine Learning Introduction to Python Introduction to Git Machine Learning Algorithms	1. Dhar V., When to Trust Robots With Decisions and When Not To, Harvard Business Review, May 2016. 2. Provost, F., Predictive Modeling With Big Data: Is Bigger Really Better? Big Data, volume 1, issue 4, Jan 2014.	1. Presentation Sign-Up 2. Module 2 Discussion 3. Module 2 Assignment 4. Module 2 Reflection **Due 1/29**

Week	Topic	Reading	Assignment/Due Dates
3	Machine Learning in Finance Part 1: Predictive Modeling Application of Machine Learning in Finance	1. Jingwen Jiang, Bryan T. Kelly, Dacheng Xiu: (Re-)Imag(in)ing Price Trends (Presentation) 2. Shihao Gu, Bryan Kelly, Dacheng Xiu: Empirical Asset Pricing via Machine Learning" Review of Financial Studies, Vol. 33, Issue 5, (2020), 2223-2273. (Presentation) 3. Stefano Giglio Bryan T. Kelly, Dacheng Xiu: Factor Models, Machine Learning, and Asset Pricing (Presentation)	1. Case Study Groups 2. Knowledge Check 3. Module 3 Discussion 4. Respond to Peer Presentation (if applicable) 5. Module 3 Assignment 6. Module 3 Reflection **Due 2/5**
4	Machine Learning in Finance Part 2	1. Zacharias Sautner Grigory Vilkov Laurence van Lent Ruishen Zhang: Firm-level Climate Change Exposure (Presentation) 2. Hassan, Tarek A., Stephan Hollander, Laurence Van Lent, and Ahmed Tahoun. Firm-level political risk: Measurement and effects. *The Quarterly Journal of Economics* 134, no. 4 (2019): 2135-2202. (Presentation) 3. Rui Da and Dacheng Xiu: When Moving-Average Models Meet High-Frequency Data: Uniform Inference on Volatility", Econometrica, Vol. 89, No. 6, (2021), 2787-2825. (Presentation) 4. Dan Philps: Machine Learning: Explain It or Bust	1. Knowledge Check 2. Module 4 Discussion 3. Respond to Peer Presentation (if applicable) 4. Case Study 1 **Due 2/12**
5	Introduction to Robo Advising The opportunities and challenges of robo advising	1. Francesco D'Acunto Alberto G. Rossi: Robo-Advising Palgrave Macmillan Handbook of Technological Finance, 2021 (Presentation) 2. Francesco D'Acunto, Nagpurnanand Prabhala, Alberto G. Rossi: The Promises and Pitfalls of Robo-Advising *Review of Financial Studies,* 2019, 32 (5), 1982-2020 (Presentation) 3. Alberto G. Rossi and Stephen Utkus: Who Benefits from Robo-advising? Evidence from Machine Learning. (Presentation)	1. Knowledge Check 2. Module 5 Discussion 3. Respond to Peer Presentation (if applicable) 4. Module 5 Reflection **Due 2/19**
6	Encryption and Information Security, Bitcoin Basics	1. Panayotis Vryonis, Public-key cryptography for non-geeks. August 28, 2013. 2. Michael Scott, The Essence of the Blockchain. Published 30 August 2016. 3. Guillaume Haeringer and Hanna Halaburda, Bitcoin: A Revolution? Published in Digital Economy 2018. 4. Satoshi Nakamoto, 2008, Bitcoin: A Peer-to-Peer Electronic Cash System, unpublished. (Presentation) 5. Pierre Rochard, Bitcoin Governance: Why we care. Medium, July 8, 2018.	1. Module 6 Discussion 2. Respond to Peer Presentation (if applicable) 3. Research Project Deliverable 1: Research Proposal 4. Module 6 Reflection **Due 2/26**
7	Cryptocurrency, Smart Contracts ,	1. Hanna Halaburda, Digital Currencies: Beyond Bitcoin. Published in Communications and Strategies 2016, Available on SSRN (Presentation)	1. Knowledge Check

Week	Topic	Reading	Assignment/Due Dates
	and Crypto-Exchanges	2. David Easley Maureen O'Hara Soumya Basu: From mining to markets: The evolution of bitcoin transaction fees, Journal of Financial Economics 134 (2019) 91–109 (Presentation) 3. Christopher Burniske, Bitcoin and Ethereum: How smart contracts work. ARK Research blog, May 29, 2016. 4. Hanna Halaburda and Miklos Sarvary, Crypto-currencies (Chapter 4 of book "Beyond Bitcoin" Palgrave 2016). 5. Gian Volpicelli, Is Libra really a cryptocurrency? Wired, Aug 14, 2019 6. Facebook wants to create a global currency, The Economist, Jun 22, 2019	2. Module 7 Discussion 3. Respond to Peer Presentation (if applicable) 4. Module 7 Reflection **Due 3/4**
8	Network Effects and Platform Strategy	1. James Currier, The Network Effects Manual: 13 Different Network Effects (and counting). Medium, January 9, 2018. 2. Strategies for Two-Sided Markets. Thomas Eisenmann, Geoffrey Parker, and Marshall W. Van Alstyne. Harvard Business Review, October 2006. 3. Hanna Halaburda and Felix Oberholzer-Gee, Limits to Scale, published in HBR April 2014. 4. Rossi, Blake, Timmerman, Tonks and Wemers, Network centrality and delegated investment performance Journal of Financial Economics 2018 (Presentation)	1. Knowledge Check 2. Module 8 Discussion 3. Respond to Peer Presentation (if applicable) 4. Case Study 2 **Due 3/10**
		Spring Break - Week of 3/10-16	
9	Digital Banking and Payment System Neobanks and What They Offer	1. Eswar S. Prasad: House Sub-committee hearing on "THE FUTURE OF MONEY: DIGITAL CURRENCY" 2. Julie L Stackhouse: Fintech: How Digital Wallets Work 3. Stephanie Walden and Doug Whiteman: What Is Fintech And How Does It Affect How I Bank? 4. Customers in the spotlight How FinTech is reshaping banking: PWC Report 5. Banking evolution: how to take on the challenges of FinTech: Thomson Reuters 6. Todd Horvath: The Future of Banking in an Era of Fintech Disruption	1. Module 9 Discussion 2. Respond to Peer Presentation (if applicable) **Due 3/25**
10	FinTech Valuation	1. Corkery, Michael. 2016. As Lending Club Stumbles, Its Entire Industry Faces Skepticism. The New York Times. Deal Book. May 9. 2. Largest M&A deals in fintech 3. Ripple vs. R3 Settlement 4. Balyuk & Davydenko. 2018. Reintermediation in Fintech: Evidence from Online Lending. (Presentation) 5. SHORT: Stanford Business Journal article about Gornall and Strebalaev, 6. LONG: Gornall, Will and Strebalaev, Ilya. 2017. Squaring Venture Capital Valuations with Reality. (Presentation)	1. Knowledge Check 2. Module 10 Discussion 3. Respond to Peer Presentation (if applicable) 4. Research Project Deliverable 2: Progress Report 5. Module 10 Reflection **Due 4/1**
11	Financial Inclusion	1. FinTechs Fueling Financial Inclusion.	1. Knowledge Check

Week	Topic	Reading	Assignment/Due Dates
		2. M-PESA. Mobile Money Transfer. 3. Bose, Abhijit. 2017. India's Fintech Revolution is Primed to Put Banks Out of Business. 4. Sachdeva, Rishabh. 2017. India's Demonetization Experiment. Medium. 5. Chakravorti, Bhaskar. 2017. Early Lessons from India's Demonetization Experiment.	2. Module 11 Discussion 3. Module 11 Assignment 4. Module 11 Reflection **Due 4/8**
12	Data and Privacy	1. Big data, financial services and privacy. The Economist, February 9, 2017. 2. How to think about data in 2019. The Economist, December 22, 2018. 3. Cybersecurity and Data Privacy in 2017: Eight Topics to Follow. By McGuireWoods LLP, January 31, 2017. 4. EU-U.S. Privacy Shield Fact Sheet.	1. Module 12 Discussion: Data and Privacy **Due 4/15**
13	Fintech Regulations	1. Robinhood concerns 2. UN piece on why sandboxes don't work for inclusion: 3. Leising, Matthew. 2017. The Ether Thief. Bloomberg Markets. 4. Milanovic, Nik. 2017. An Obscure Regulatory Debate Has Put The Entire U.S. Fintech Community On Edge. 5. Popper, Nathaniel. 2017. "Silicon Valley Tried to Upend Banks. Now it Works with Them," The New York Times. 6. The FCA's Global Fintech Sandbox 7. Here's What China's Regulatory Reshuffle Could Mean for Fintech. Business Insider. 2018. 8. Wang, Wei and Dollar, David. 2018. What's Happening with China's Fintech Industry? 9. McNulty, Lucy. 2017. 10 RegTech Firms to Watch. Financial News.	1. Module 13 Discussion **Due 4/22**
14	Autonomous Finance" Risk: cyber, operational, latency risks	1. Bangladesh Bank Heist: a. Zetter, Kim. 2015, "That Insane, $81m Bangladesh Bank Heist? Here's What We Know," Wired, May 17, available at Escape of NSA tools: How Chinese Spies Got the N.S.A.'s Hacking Tools, and Used Them for Attacks 2. Herstatt Risk: 3. Bitcoin thievery: a. Adelstein, Jake and Nathalie-Kyoko Stucky, 2016, "Behind the Biggest Bitcoin Heist in History: Inside the Implosion of Mt. Gox," The Daily Beast, May 19. b. Note: Joseph Menn, 2016, "Former U.S. Secret Service Agent Suspected in Additional Bitcoin, Thefts," Reuters, June 30 4. Flash crash: a. Yang, Stephanie. 2015. "Remembering the Flash Crash from the NYSE Trading Floor," The. Wall Street Journal, May 6.	1. Module 14 Discussion 2. Research Project Deliverable 3: Presentation (Initial submissions for both assignments are **due 4/28** and replies/feedback to classmates are **due 4/30**)

Week	Topic	Reading	Assignment/Due Dates
		b. Hope, Bradley and Ackerman, Andrew. 2015, "'Flash Crash' Overhaul Is Snarled in Red Tape," The Wall Street Journal, May 5, c. Note: The joint SEC-CFTC report on the flash crash can be downloaded by those interested. 5. Wirecard: a. The FT did a series of investigative reports about money-laundering and accounting fraud accusations against Wirecard, the largest European e-money licensed bank used by many fintechs.	
15	Final Project		1. Module 15 Discussion 2. Research Project Deliverable 4: Final Paper **Due 5/5**

Additional Information and Resources

Accessibility:

This course is offered through an accessible learning management system. For more information, please refer to Canvas's Accessibility Statement.

Requesting Accommodations:

The Office of Accessibility Resources and Services works in partnership with administrators, faculty, and staff to provide reasonable accommodations and support services for students with disabilities who have provided their office with medical documentation to receive services.

If you are in need of accommodations due to a disability, please contact the Office of Accessibility Resources and Services to discuss your specific needs.

Resources for NJIT Online Students

NJIT is committed to student excellence. To ensure your success in this course and your program, the university offers a range of academic support centers and services. To learn more, please review these Resources for NJIT Online Students, which include information related to technical support.