

**NYU Tel Aviv**  
**Fall 2018**  
**MULT-UB 9080 Section T01**  
**Foundations of FinTech**

## **Instructor Information**

- Lyron Wahrmann
- Mobile: +972-54-4699349
- lw98@nyu.edu
- Office Hours: by appointment

## **Course Information**

- MULT-UB 9080T01
- Foundations of FinTech
- “FinTech” refers to financial sector innovations involving technology-enabled business models that can facilitate disintermediation, revolutionize how existing firms create and deliver products and services, address privacy, regulatory and law-enforcement challenges, provide new gateways for entrepreneurship, and seed opportunities for inclusive growth. This introductory course brings a 360-degree view on FinTech. Firstly, we’ll explore the emergence of new business models in various areas of banking, insurance and wealth management. Secondly, we’ll focus on how the technological advance in data and analytics are enabling the financial sector innovations. Special attention will be devoted to BlockChain, the ‘internet of finance’ and its potential of further transforming the sector. Lastly, we will deal with the increasing security and privacy concerns, operational risks as well as social challenges that emerged as part of the FinTech transformation.
- Prerequisites: None
- Tuesdays, 4:00-7:00pm
- NYUTA Academic Center, 17 Brandeis Street, Innovation Studio

## **Course Overview and Goals**

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

- Understand the unique technological, business, and ethical characteristics of financial innovation and financial services business models.
- Identify the critical technology strategies, methods, tools, and foundational technologies in the FinTech sector.

- Understand the main arguments that dominate the current archaeological and historical disciplines.
- Apply basic FinTech data science methods and tools to tackling real-world problems.

## Course Requirements

### Class Participation

Attendance, preparation (reading materials) and active participation.

### Four Assignments

The assignments will cover materials presented in class and beyond in the goal of concretizing them. They will be given on the following respective weeks: 3, 6, 8 and 10.

- Exercise 1 will deal with the role of Governments or NGOs in promoting the FinTech space.
- In exercise 2 students will ‘hands-on’ practice data science techniques for FinTech applications.
- Exercise 3 will deal with ethical and legal aspects related to FinTech and data.
- In exercise 4 students will need to apply the course materials to real FinTech companies.

### Midterm Exam

Multiple choice questions covering both lectures and reading material.

### Final Exam

Combination of multiple choice questions, open questions and case analysis covering both lectures and reading material from the entire course.

### Grading of Assignments

At NYU Stern, we strive to create courses that challenge students intellectually and that meet the Stern standards of academic excellence. To ensure fairness and clarity of grading, the Stern faculty have agreed that for elective courses the individual instructor or department is responsible for determining reasonable grading guidelines.

I have elected to use the following grading guidelines for this course:

Assignments/Activities	% of Final Grade
Class Participation	10%
Four Assignments	40%
Midterm Exam	20%

Assignments/Activities	% of Final Grade
Final Exam	30%

Failure to submit or fulfill any one of the required course component results in failure of the class.

## Course Schedule

### Topics and Assignments

Week/Date	Topic	Reading	Assignment Due
Aug. 28	The FinTech opportunity to improve the Financial System	<p>Citi GPS. "<a href="#">Digital Disruption - How FinTech is Forcing Banking to a Tipping Point.</a>" <i>Global Perspectives &amp; Solutions</i>. Mar 31, 2016.</p> <p>Citi GPS. "<a href="#">Digital Disruption – Revisited - What FinTech VC investments tell us about a changing industry.</a>" <i>Global Perspectives &amp; Solutions</i>. Jan 23, 2017.</p> <p>KPMG. "<a href="#">The pulse of FinTech.</a>" Feb 13, 2018.</p>	Exercise #1 published
Sept. 4	"Data is giving rise to a new Economy"	<p>"<a href="#">Fuel of the future, Data is giving rise to a new economy. How is it shaping up?</a>" <i>The Economist</i>. May 6, 2017.</p> <p>Sandy Smolan and William Medsker. "<a href="#">The Human Face of Big Data.</a>" Apr 10, 2014.</p> <p>Thomas Eisenmann, Geoffrey Parker and Marshall W. van Alstyne. "Strategies for Two-Sided Markets." <i>Harvard Business Review</i>. Oct 2006.</p>	
Sept. 12	Intro to Artificial Intelligence	<p>Dhar, V. "Data Science and Prediction." <i>Communications of the ACM</i> 56.12 (2013).</p> <p>Provost and Fawcett. "Introduction to Predictive Modeling: From Correlation to Supervised Segmentation."</p>	Exercise #1 due

Week/Date	Topic	Reading	Assignment Due
		<p><i>Data Science for Business</i>, Chapter 3.</p> <p>Provost and Fawcett. "Overfitting and its Avoidance." <i>Data Science for Business</i>, Chapter 5.</p> <p>Provost, F. "<a href="#">Predictive Modeling with Big Data: Is Bigger Really Better?</a>", <i>Big Data</i> 1.4 (2014).</p>	
Sept. 18	<p>From Traditional to "Deep" Learning</p> <p>Lecturer: Dr. Oren Glickman</p>	<p>Dhar, V., and R. Stein. "Neural Networks." <i>Seven Methods for Transforming Corporate Data into Business Intelligence</i>, Chapter 6.</p> <p><a href="#">"Machine Learning is Fun! Part 3: Deep Learning and Convolutional Neural Networks"</a></p>	
Oct. 2	<p>Robo-Advisors reshaping millennials' management of wealth</p>	<p>B. Beardsley, H. Donnadieu et al. "<a href="#">The innovator's advantage</a>", <i>BCG</i>. Jul 11, 2017.</p> <p>Chappuis Halder &amp; Co. "<a href="#">How disruptive will robo advisory, algorithmic trading and machine learning platforms really become?</a>" Dec, 2016,</p> <p>FacebookIQ, "<a href="#">Millennials + Money: The Unfiltered Journey.</a>" Jan 26, 2016.</p> <p>CBinsight. "<a href="#">We Analyzed 7 Of The Fastest-Growing Personal Finance Apps Of All Time To Figure Out The Secrets To Their Success — Here's What We Learned.</a>" Oct 10, 2017.</p> <p>Institutional Investor. "<a href="#">Asset Managers, Prepare to Have Your Business Disrupted.</a>" Apr 11, 2016.</p>	
Oct. 9	"Single Click" Loans	T. Ziegler, E.J. Reddy et al. " <a href="#">2017 The Americas</a>	

Week/Date	Topic	Reading	Assignment Due
		<p><a href="#">Alternative Finance Industry Report</a>.” Cambridge Centre for Alternative Finance. May 2017.</p> <p>George Hofheimer and Linda Young.“ <a href="#">Blue Ocean Lending for Credit Unions: Point of Sale Financing</a>.” May 19, 2015.</p> <p>Julie Verhage. “<a href="#">John Mack-Backed Data startup announces new funding and partners</a>.” Aug 2, 2017.</p>	
	Digitization of Trading	<p>Peter Hafez. “<a href="#">JP Morgan's Take on Valuation Strategies based on Machine Learning and RavenPack Sentiment</a>.” September 25, 2017.</p> <p>Cade Metz. “<a href="#">The rise of the artificial intelligence hedge fund</a>.” <i>Wired</i>. Jan 25, 2016.</p> <p>Cade Metz. “<a href="#">7,500 faceless coders paid in bitcoin buildt a hedge fund's brain</a>.” <i>Wired</i>. Dec 12, 2016.</p> <p>Matthew Griffin, “<a href="#">No humans required, the fully autonomous AI running a Wall Street hedge fund</a>.” <i>Fanatical Futurist</i>. Mar 7, 2017.</p>	
Oct. 16	“Surprise and delight your customers by going beyond their expectations”.	<p>Alexander Felfernig, Michael Jeran, Gerald Ninaus, Florian Reinfrank, Stefan Reiterer, and Martin Stettinger. “<a href="#">Basic Approaches in Recommendation Systems</a>.” 2014.</p> <p>F.O. Isinkaye, Y.O. “Recommendation systems: Principles, methods and evaluation.”</p> <p>Folajimi, B.A. Ojokoh, <i>Egyptian Informatics Journal</i> 16.3 (2015): 261-273.</p> <p>“<a href="#">Recommender Systems</a>”, Machine Learning Summer</p>	

Week/Date	Topic	Reading	Assignment Due
		School 2014 @ CMU Diana Hu. " <a href="#">Scalable Recommender Systems: Where Machine Learning Meets Search!</a> " RecSys, 2015.	
Oct. 23	Differential pricing – legit or not?	Adam Tanner. " <a href="#">Different customers different prices thanks to big data.</a> " <i>Forbes</i> , 2014.  " <a href="#">Airline pricing secrets</a> ", <i>CNN Travel</i> , 2017.  Dan Hill. " <a href="#">The secret of airbnbs pricing algorithm.</a> " <i>iEEE Spectrum</i> , 2015.  " <a href="#">Big Data and Differential Pricing</a> ", Obama White House Archives, Feb 2015.	
Oct. 30	Bitcoin cryptocurrency and payment system demystified	Michael Scott. " <a href="#">The Essence of the Blockchain.</a> " Aug 30, 2016.  Scott Driscoll. " <a href="#">How Bitcoin Works Under the Hood.</a> "	
Nov. 6	'Smart Contracts' using a distributed ledger	Christopher Burniske. " <a href="#">Bitcoin and Ethereum: How smart contracts work.</a> " <i>ARK Research Blog</i> . May 29, 2016.  " <a href="#">Ethereum, A Virtual Currency, Enables Transactions that Rival Bitcoin's.</a> " <i>New York Times</i> . March 27, 2016.  David Siegel. " <a href="#">Understanding the DAO Hack for Journalists.</a> " June 19, 2016.  Mathew Leisin. " <a href="#">The Ether Thief.</a> " <i>Bloomberg Markets</i> . June 13, 2017.	
Nov. 13	Cryptocurrency Ecosystem - present and future  Lecturer: Mr. Tomer Zaharovich	Bob Mason. " <a href="#">What is an ICO (Initial Coin Offering) and How does it work?.</a> " <i>FXEmpire</i> . June 2017.  Gideon Greenspan. " <a href="#">Ending the bitcoin vs. blockchain debate.</a> " July 20, 2015.	

Week/Date	Topic	Reading	Assignment Due
		<p>Kai Stinchcombe. "<a href="#">Ten years in, nobody has come up with a use for blockchain.</a>" Dec 2017.</p> <p>Jake Adelstein and Nathalie-Kyoko Stucky. "<a href="#">Behind the Biggest Bitcoin Heist in History: Inside the Implosion of Mt. Gox.</a>" <i>The Daily Beast</i>. May 19, 2016.</p> <p>Spandan Sharma. "<a href="#">CryptoKitties: how virtual cat trading is shaking up the Ethereum blockchain.</a>" <i>YourStory</i>. Dec 7, 2017.</p>	
Nov. 20	"Risk and high risk: Walking the GDPR tightrope"	<p>Panayotis Vryonis. "<a href="#">Public-key cryptography for non-geeks.</a>" Aug 28, 2013.</p> <p>The Mozilla Foundation, "<a href="#">Encryption and Decryption.</a>" Jun 4, 2015.</p> <p>The Mozilla Foundation, "<a href="#">Introduction to Public-Key Cryptography.</a>" Mar 21, 2015.</p> <p>Paul Schwartz. "<a href="#">Risk and high risk: Walking the GDPR tightrope.</a>" <i>IAPP</i>. Mar 29, 2016.</p> <p>"<a href="#">EU-U.S. Privacy Shield Fact Sheet.</a>" <i>European Commission</i>. July 2016.</p> <p>Michael Barbaro &amp; Tom Zeller, Jr. "<a href="#">A Face Is Exposed for AOL Searcher No. 4417749.</a>" <i>NY Times</i>. Aug 9, 2006.</p> <p>The Economist. "<a href="#">Big data, financial services and privacy.</a>" Feb 9, 2017.</p> <p>"<a href="#">Cybersecurity and Data Privacy in 2017: Eight Topics to Follow.</a>" <i>McGuireWoods LLP</i>. Jan 31, 2017.</p> <p>Matthew Green. "<a href="#">What is Differential Privacy?</a>" 2016.</p> <p>Christian Zibreg. "<a href="#">A closer look</a></p>	

Week/Date	Topic	Reading	Assignment Due
		<p><a href="#">at Differential Privacy in iOS 10 and macOS Sierra.</a>” June 25, 2016.</p>	
Dec. 4	AI-based Crime Prevention	<p>Krishna N. Das and Jonathan Spicer. “How the New York Fed fumbled over the Bangladesh Bank cyber-heist.” <i>Reuters</i>. July 21, 2016.</p> <p>Kim Zetter. “That insane, \$81M Bangladesh bank heist, here’s what we know.” <i>Wired</i>. May 17, 2016.</p> <p>David Segal. “<a href="#">Eagle Scout, Idealist. Drug Trafficker?</a>” <i>The New York Times</i>. Jan 18, 2014.</p> <p>Chris Giles. “<a href="#">Bank of England Attacked Over Payment Systems Failure.</a>” <i>The Financial Times</i>. March 25, 2015.</p> <p><a href="#">Deloitte report: partly redacted by the Bank of England.</a></p> <p>Stephanie Yang. “<a href="#">Remembering the Flash Crash from the NYSE Trading Floor.</a>” <i>The Wall Street Journal</i>. May 6, 2015.</p>	
Dec. 11	Social implications of FinTech Transformation	<p>Nathaniel Popper. “<a href="#">The robots are coming for Wall street.</a>” <i>The New York Times Magazine</i>. Feb 25, 2016.</p> <p>Dhar V. “<a href="#">When to Trust Robots With Decisions and When Not To.</a>” <i>Harvard Business Review</i>. May 2016.</p> <p>Dhar, V. “<a href="#">Robots Will Soon Do Your Taxes: Bye Bye Accounting Jobs.</a>” <i>Wired</i>. Feb 2017.</p> <p>Hugh Son. “<a href="#">JPMorgan Software Does in Seconds What Took Lawyers 360,000 Hours.</a>” <i>Bloomberg Markets</i>.</p>	



Week/Date	Topic	Reading	Assignment Due
		February 27, 2017.	

### Tests and Quizzes

- [Insert test name and date]

## Course Materials

### Required Textbooks & Materials

All readings are available on NYU Classes

### Optional Textbooks & Materials

N/A

### Resources

- **Access your course materials:** [NYU Classes](http://nyu.edu/its/classes) (nyu.edu/its/classes)
- **Databases, journal articles, and more:** [Bobst Library](http://library.nyu.edu) (library.nyu.edu)
- **Assistance with strengthening your writing:** [NYU Writing Center](http://nyu.mywconline.com) (nyu.mywconline.com)
- **Obtain 24/7 technology assistance:** [IT Help Desk](http://nyu.edu/it/servicedesk) (nyu.edu/it/servicedesk)

## Course Policies

### Attendance and Tardiness

Study abroad at Global Academic Centers is an academically intensive and immersive experience, in which students from a wide range of backgrounds exchange ideas in discussion-based seminars. Learning in such an environment depends on the active participation of all students. And since classes typically meet once or twice a week, even a single absence can cause a student to miss a significant portion of a course. To ensure the integrity of this academic experience, class attendance at the centers is mandatory, and **unexcused absences will be penalized with a two percent deduction from the student's final course grade**. Students are responsible for making up any work missed due to absence. Repeated absences in a course may result in failure.

All medical-based absence requests **MUST** be presented to the Manager of Student Life and Housing (MSLH). In the case of illness, contact the MSLH within seven (7) days of the absence or as soon as practicable and provide medical documentation. Non-medical requests should be made to the Assistant Director for Academics (AD/Academics) and in advance of the intended absence. Your instructors will be informed of any excused absence; they are not authorized to approve your absence, and they are required to report any absences to the AD/Academics.

## **NYU Policy on Religious Holidays**

- Students who anticipate being absent because of any religious observance should, whenever possible, notify faculty and the AD/Academics in advance of such anticipated absence.
- Whenever feasible, examinations and assignment deadlines should not be scheduled on religious holidays. Any student absent from class because of his/her religious beliefs shall not be penalized for any class, examination, or assignment deadline missed on that day or days. In the event that examinations or assignment deadlines are scheduled on a religious holiday, any student who is unable to attend class shall be permitted the opportunity to make up any examination or to extend any assignment deadline missed on that day or days.
- No adverse or prejudicial effects shall result to any student who avails him/ herself of the provisions of the resolution.
- A violation of these policies and principles shall permit any aggrieved student to bring forward a grievance, provided under the University Grievance Procedure.

## **Late Assignments**

All works must be submitted on time unless you have received an explicit extension. Any late submission may result in grade deduction at the sole discretion of the instructor.

## **Academic Honesty/Plagiarism**

Plagiarism is the presentation of another person's words, ideas, judgment, images or data as though they were your own, whether intentionally or unintentionally. Plagiarism constitutes an academic offence for which you can be disciplined. Punishment may include a failing grade, suspension or expulsion. In all confirmed cases, a report will be sent to the student's Dean at NYU or, in the case of a non-NYU student, to the home institution.

## **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](mailto: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.

## **Instructor Bio**

Lyron Wahrmann has years of experience in various high-level management and R&D positions. Today, Lyron is in the process of founding a FinTech startup leveraging artificial intelligence to build a robo-analyst and serves as FinTech lecturer at IDC Herliya and NYU Tel Aviv. He established and headed the Citi Technology Innovation Center in Israel until 2016. Before joining Citigroup, Lyron held various positions at SuperDerivatives, a global leader in cloud-based market data, derivatives trading technology and analytics, where he led the R&D team of the Pricing Division and served as a Quantitative Analyst.

Lyron earned an M.Sc. and B.Sc. in Applied Mathematics from the Technion, as well as a B.A. in Business Management and International Relations from the Hebrew University.