FIN4123/FIN4718 FinTech Management

SEM 2, AY2019/2020 – Course Syllabus

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Section: TBD

Room: TBD
TA: TBD

Course Description: Fintech continues to be a very popular focus within financial markets in the age of technology. Long protected by regulatory environments, financial institutions are coming under challenge from powerful technology providers who are able to deliver at greater efficiency and lower costs. This trend has forced FIs to embrace technology like never before. The common myth and perception is that this wave of technology will redefine society and career paths. And it is important to understand how the future of FIs and disruptors will likely evolve and the implications for financial disintermediation.

This module is targeted towards BBA (although possibly also BACC) students in the NUS Business School, and focuses on the business effects of technological change, rather than on the technological change itself.

The impact of Fintech in the fields of finance, accounting, banking, insurance, wealth, pensions are far reaching and its sphere of influence is likely to continue. With the imminent onset of 5G and quantum computing, better algorithms in data science and big data, artificial intelligence and machine learning, the prospects of how fintech will evolve looks both exciting and challenging. It affects how institutions, society and agents interact, transact and engage. The amount of investments that have been channeled into fintech development has accelerated beyond expectations.

Ranging from Blackrock using robo-analysts for research and investments to how crypto exchanges trade crypto currencies and beyond, the implications and applications are far reaching in terms of scope and impact. Retirement planning will be made easier, safer and more transparent. Financial transactions will be more secure and versatile. Risks and information will be processed at greater frequencies and spectrums. Costs will be reduced and quality likely be improved. This is the promise of fintech.

The US and China are leading the way in fintech and its entourage. Singapore, Hong Kong, London, Tel-Aviv are also forging great efforts to catchup with new business models that integrate fintech in their capital markets and institutions which operate within that eco-system. Underbanked emerging countries are using fintech to penetrate the masses while overbanked developed markets use fintech to provide better solutions to traditional banking.

And central banks and regulators are forced to better understand ways in which the world of fintech is affecting their modus operandi and policy implications. Not only how conventional policy tools measure up in the new world of fintech but also new thinking on ethical and governance standards needed to ensure the well-functioning of new technologies.
TOPICS

1. **Introduction to Fintech**
   - FinTech vs TechFin

2. **Encoding, Integrity, Confidentiality, Identity Numeral Systems, Cryptography & Encryption**
   - Numeral Systems & Hashing Functions
   - Cryptography, Encryption, & Digital Signatures

3. **Blockchain and Distributed Ledger Technologies**
   - Consensus Protocols
   - Nodes, Merkel Roots

4. **Tokenization and ICOs**
   - Utility vs Security Tokens - Bitcoin, Ethereum and other Cryptos
   - Smart Contracts and DÁpps

5. **Big Data and Machine Learning**
   - Big Data v Alternative Data
   - Supervised, Unsupervised, & Reinforcement Learning

6. **Machine Learning Exercise**
   - Hands on exercise
   - MID-TERM QUIZ

7. **AI & Deep Learning**
   - Deep Learning
   - Neural Networks

8. **Language Processing**
   - Natural Language Processing
   - Natural Language Generation

9. **Fintech in Investments**
   - Stock Selection and Algo Trading
   - Portfolio Management and Robo-Analysts

10. **Fintech in Banking**
    - Payment Systems & Credit analysis
    - Wealth Management and Robo Advisors

11. **Fintech in Insurance & Regulations**
    - Claims Processing
    - On Demand Protection & AI Underwriting

12. **Other Issues in Fintech**
    - Social Impact

13. **Project Presentation**
    - FINAL QUIZ
Reading Materials


Learning Outcomes

The objective of this module is to give participants a comprehensive introduction to key aspects of FinTech paradigm and practice. Starting from theory and concepts, students will be taught the ongoing developments in the field and how they can integrate paradigms into practice and how practice drives paradigms.

The course will integrate various categories of fintech development areas into a core wealth and investment platform which will be used as a framework for project work. For example, how do we build an effective Anti-Money Laundering (AML) prototype into a wealth management platform. How can one develop a risk monitoring and management capability component into the core platform that can effectively estimate value at risk or stress scenarios. The varied nature of the project is designed to stimulate either the entrepreneurship spirit or the technological aspirations of the student.

The course is targeted at students looking to pursue and enhance their careers in the financial, banking and insurance sectors by enlarging his knowledge base and skill set. The outcomes are outlined below:

- Better prepared to enter into financial institutions ready to contribute to current industry developments
- Have a better understanding of what it takes to be a technology entrepreneur in the field of finance.
- Be able to engage in hands-on greenfield fintech projects

Students are expected to:

1. Participate fully in class discussions and complete the pre-reading for each weekly session
2. Develop an entrepreneurial and disruptive mindset when looking at existing business practices in the financial services industry
3. Work diligently and collaboratively within their group for the FinTech project
4. Read extensively in relation to current trends and new developments in the FinTech sector

NUS Recess Week: 21 Sep 2019 – 29 Sep 2019

Quiz 1: Held on September 2019

Quiz 2: Held on November 2019. There is no Final Exam in this module.

GUEST SPEAKERS: Depending on time, we may have guest speakers from FinTech start-ups.

Grading:

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<th>Quantity</th>
<th>Type</th>
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<tr>
<td>1</td>
<td>Quiz 1 (TBA – in class)</td>
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<tr>
<td>1</td>
<td>Quiz 2 (TBA – in class)</td>
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<td>Fintech Project &amp; Exercise</td>
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<tr>
<td>1</td>
<td>Class Participation</td>
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DATED: 4 Dec 2019
### APPENDIX A

#### Schedule

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<tr>
<th>Wk</th>
<th>Topic</th>
<th>Readings</th>
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| 1  | Fintech: An Introduction | 1) The Fintech Book, Chap 1&2  
2) "FinTech and RegTech in a Nutshell, and the Future in a Sandbox, Research Foundation  
3) "Fintech and Financial Services", IMF  
4) "The Emergence of the Global Fintech Market: Economic and Technological Determinants", CESifo |
| 3  | Blockchain & Distributed Ledger Technology | 6) "An Introduction to Blockchain", U Virginia Case  
7) "The essence of the blockchain", Scott  
8) "The Blockchain Revolution: Analysis or Regulation and Technology Related to DLT", Kakavand et.al.  
10) What Blockchain Can't Do - HBR - 2018 |
| 4  | Tokenisation and ICOs | 11) "Smart Contracts – White Paper", Softjourn  
12) "Coin Operated Capitalism", U Penn Law  
13) LIBRA - Global Challenger in payments and for Central Banks - DB  
14) "Cryptocurrencies: Beyond the Hype", BIS Papers  
15) "ICO Rating Report on Solana", icorating.com  
16) "Crypto technology: A solution still seeking a problem", Barclays |
| 5  | Big Data & Machine Learning | 17) "Big Data and AI Strategies for Investing", JPMorgan  
| 6  | Machine Learning Exercise | 19) To be handed out |
| 7  | AI & Deep Learning | 20) "A Very Brief History of Artificial Intelligence", B Buchanan  
21) "Artificial Intelligence", M Minsky  
22) "When will AI Exceed Human Performance?" Oxford  
23) "Artificial Intelligence and Life in 2030" Stanford 100 yr Study on AI |
| 8  | Language Processing | 24) "Natural language processing: an introduction", Nadkarni et.al. |
| 9  | Fintech in Investment Mgmt | 25) "Fintech in Investment Management", CFA Readings  
26) "Blackrock Robo-Advisor 4.0 - When AI replaces Human Discretion"  
27) "Alternative Data, Machine Learning & Artificial Intelligence Developments in 2019" - JPM |
| 10 | Fintech in Banking | 28) "Rise of the Fintechs: Credit Scoring Using Digital Footprints", FMC |
| 11 | Fintech in Insurance & Regulations | 29) The Fintech Book, Chap 5  
| 12 | Other Issues in Fintech | 31) None |
| 13 | Class Project Presentations | 32) Class Presentations |

**DATED: 4 Dec 2019**
ACADEMIC HONESTY & PLAGIARISM – A WORD FROM YOUR SPONSOR

Academic integrity and honesty is essential for the pursuit and acquisition of knowledge. The University and School expect every student to uphold academic integrity & honesty at all times. Academic dishonesty is any misrepresentation with the intent to deceive, or failure to acknowledge the source, or falsification of information, or inaccuracy of statements, or cheating at examinations/tests, or inappropriate use of resources.

Plagiarism is ‘the practice of taking someone else's work or ideas and passing them off as one's own' (The New Oxford Dictionary of English). The University and School will not condone plagiarism. Students should adopt this rule - You have the obligation to make clear to the assessor which is your own work, and which is the work of others. Otherwise, your assessor is entitled to assume that everything being presented for assessment is being presented as entirely your own work. This is a minimum standard. In case of any doubts, you should consult your instructor.

Additional guidance is available at:

http://www.nus.edu.sg/registrar/adminpolicy/acceptance.html#NUSCodeofStudentConduct

Online Module on Plagiarism:

http://emodule.nus.edu.sg/ac/