Module Outline

Programme : Undergraduate
Module Code : FIN4724
Module Title : Economics of Blockchain Applications and Decentralized Finance
Class Date : From 13/8/2025 To 12/11/2025
Semester : Semester 1 Academic Year 2025/2026
Faculty : Emir Hrnjic, PhD
Department : Finance
Classroom : BIZ1, #03-01
Student hours : Tuesdays 2–3 pm, BIZ1, #7-61
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Overview

This course provides non-technical fundamentals and economics of digital assets, blockchain applications in finance, and decentralized finance. The goal of the course is to provide students with a set of skills to understand the concepts and applications of the blockchain technology in finance and decentralized finance. We will occasionally invite an industry expert to interact with students and give a guest lecture on the real-world application.

Module objectives

This course empowers students with the understanding of digital assets, blockchain, their applications in the finance industry, and decentralized finance. Through lectures, discussions, case studies, and project, students will demonstrate an understanding of various real-world applications of digital assets and blockchain as well as grasp and elaborate the use of economic fundamentals of various blockchain applications. The course is focused on non-technical understanding of how blockchain and digital assets can help improve business as well as the most recent ideas, techniques, and trends in blockchain, digital assets, and decentralized finance.

This is a course for business students, not computer programmers. By design, and by necessity, the course will not cover in depth every topic introduced in the lectures. Nonetheless, it lays a foundation on which students can build further via more advanced courses or reading on their own.

Assessment

The final course grade will be computed based on the following weights:

Assessment Components	Weight
Case study submissions	10%
In-class participation	20%
Test 1	15%
Test 2	25%
Team project	30%
Post-semester reflection	optional
Total	100%

In-class participation:

Students are required to sit at the same seat and display a name sign throughout the semester.

Even though the real world can sometimes be less forgiving, the classroom is a laboratory whose *raison d'être* is to serve your learning needs. This means that you should ask questions during class if something is not clear.

In-class participation grades will be allocated based on quality of participation. In evaluating class participation, I will look for comments that are thoughtful and lead the discussion forward. Excellent participation involves enhancing the class experience for your classmates by answering questions that I ask of you or the class, making relevant comments, posing valuable questions, and participating when your classmates make presentations. Peer-learning is the bedrock of the MBA education; please take advantage of your classmates' knowledge and experience.

"Cold calls" will be used extensively. Excellent participation involves enhancing the class experience for your classmates by answering questions, making relevant comments, posing valuable questions, and participating when your classmates make presentations. It is often an advantage in business situations to be able to answer a cold call well; the classroom is a good place to develop this skill. Cold calling is meant to encourage advance preparation, while also allowing me to monitor the progress of the class. You are always allowed to "pass" on a question if you do not know the answer (though you should only have to do this a limited number of times); you can also ask for the question to be repeated, or for a little extra time.

Case studies

We will utilize case studies to further explore topics presented in the lectures as well as to introduce new ones. Case studies aim to document a real-life business challenge, where the reader is presented with much of the relevant information needed to make a decision, but also with the kinds of superfluous references, ambiguity, and incompleteness one encounters in the real world.

Prior to discussing each case in class, you will be given a list of questions that will guide your preparation. You should come to class prepared to engage in a meaningful discussion.

Each case study assignment is limited to a maximum of two pages and is due at the beginning of the class. ***Late submissions and email submissions will not be accepted.***

Neither lecture notes nor Excel spreadsheets will be posted for the case studies after the in-class discussion. It is your responsibility to take notes during the in-class discussion.

Tests

Closed-book tests will consist of multiple-choice questions and will cover all assigned readings and problems as well as material covered and discussed in class. If you have a medical emergency, please let me know.

Team project and presentation

You will be assigned to a team of 5-7 students for the analysis and presentation of the project. The objective of the team project is to identify, analyze, and present **finance-related real-world application of blockchain**. Please note that I am not asking you to propose your own blockchain application, but rather the one that is already existing, being developed, or proposed in the real world by a specific company and is finance related.

I would prefer a valuable solution, even though you can choose to critique a useless blockchain application instead (we can learn from failures as well). If you choose to critique a useless blockchain application, you need to clearly identify reasons for failure(s) and be ready to propose a better solution(s). If the company have several different blockchain applications, focus on one.

The ideal presentation would provide clear description of the problem and the proposed solution. Presentation should clearly explain how blockchain solves the existing real-world problem (or an anticipated problem). More specifically, presentation should explain how blockchain provides better, faster, cheaper, safer, etc, solution to a problem. You need to consider the competitors as well. Presentations do not have guidelines (except time limit – to be shared later). The team decides format of the presentation.

Here are some basic guidelines:

- You should explain why it is an interesting problem and a valuable solution.
- While you should try to present a valuable solution, do not be overly defensive about it.
- Be aware of the issues/limitations of the solution and lay them out explicitly.
- What solutions are offered by competitors and how different your company is.
- Focus on economics of the issue, not technical details. Leave tech details to tech students and tech professionals.
- Be aware of the strict time limitations; practicing helps.
- Focus more on the substance of your presentation and less on fancy slides.
- Be prepared for questions.

The benefits of identifying your own topic are numerous; I would encourage you to take this seriously. However, if the team cannot find a topic, I will assign the topic to your team, but will subtract 20% from the grade.

Please submit the project outline (one document of 1-4 ppt slides per team) to Canvas by the above-mentioned deadline. If I do not receive the tentative outline of the presentation by the deadline, I will automatically assign the topic to your team (and subtract above-mentioned percentage).

Here are some pointers regarding **the project proposal** submission and presentation.

You need to submit a very brief proposal for your project (1-4 ppt slides). You should simply describe what you are planning to do, and you need to make an oral presentation of your project topic (with the help of 1-4 ppt slides). You should assign **1-2 person(s)** from your team to present the project proposal. Other team members may help answer the questions (should there be any). The idea of the proposal presentation is to get your project going and give me (and other teams) a chance to understand what you are planning to do (and potentially give you feedback).

Duration of the presentation is 4-5 minutes.

If you change the topic of the project after the proposal, you will have your grade reduced by 20%.

Here are some pointers regarding **the project** submission and presentation.

At the beginning of the team presentation, please submit a hard copy of your presentation to me in the classroom (one black-and-white document per team, 2 slides per page, stapled).

Presentations are graded based on the following equally-weighted criteria: quality of research and analysis, clarity of presentations (including visuals), and ability to clearly answer questions. Not all members need to present. You should divide the work the way you see fit.

Time limit is 10-15 minutes for the presentation and 8-10 minutes for the Q&A session.

After the team presentation in class, please submit your ppt presentation (one document per team) to Canvas within 24 hours after the presentation (you may incorporate class feedback if you deem fit). Presentations will be graded as a team (not individually).

Presenting Team	**Discussing Team**
1	4 and 6
2	5 and 1
3	6 and 2

4	1 and 3
5	2 and 4
6	3 and 5

Post-Semester Reflection

Post-semester reflection is one-page summary of key learning points from the course. I encourage you to write this summary 1-2 weeks after the semester ends. You may use any format and any material (including the material that was not presented or recommended in class). The main idea is to reflect on the learning journey after the material settled. This summary is optional and carries no extra credit.

Schedule and Outline:

Lecture	Topics	Required readings and submissions	Supplementary readings
1 – Aug 13	**Syllabus / Outline** **History of Money**		DeFi and the Future of Finance, Ch. II
2 – Aug 20	**Blockchain and Cryptocurrencies**		*An Introduction to Blockchain, (Ivey Publishing) UVA-F-1810* DeFi and the Future of Finance, Ch. II and Ch. III Cryptoassets, Ch. 1-3
3 – Aug 27	**Multifactor Models of Risk and Returns** **Risk and Returns of Crypto Assets**	*Case study: Bitcoin's Rollercoaster Risk and Returns: Sharp(e) Analysis*	Liu and Tsyvinsky (2021) Risks and Returns of Cryptocurrency
4 – Sept 3	**Risk and Returns of Crypto Assets (cont'd)**		Liu et al (2022) Common Risk Factors in Cryptocurrency Liu et al (wp, 2022) Accounting for Cryptocurrency Value Cong et al (2022) Value Premium, Network Adoption, and Factor Pricing of Crypto Assets
5 – Sept 10	**DeFi Applications** **Test 1 Tutorial**		DeFi and the Future of Finance, Ch. III, IV, and VI
6 – Sept 17	**Test 1** **DeFi Myths and Facts**	*Present your proposal in class (4-6 min)*	**Submit the proposal by Sept 18 at 12 pm**
RECESS WEEK / SEPTEMBER 21 – SEPTEMBER 29			

7 – Oct 1	**Test 1 solutions** **Team project proposals**		
8 – Oct 8	**Stablecoins and CBDCs** **Monetary Policy Implications**		G7 Working Group on Stablecoins: Investigating the impact of global stablecoins Behind the Scenes of Central Bank Digital Currencies, IMF FinTech Notes A Note on Stablecoins, Ivey Publishing, W37535
9 – Oct 15	**ICOs and** **Raising Capital**	*Case study: Yuser: Funding Start-up Growth with Token Issuance?*	**Submit the answers to Yuser case questions by Oct 16 at 6 pm** Cryptoassets, Ch. 16 Lyandres et al (2021) Initial Coin Offerings: A Review
10 – Oct 22	**Tokenization** **Test 2 Tutorial**	*Case study: ADDX's Tokenization Dilemma*	**Submit the answers to ADDX case questions by Oct 23 at 6 pm** Digital Asset Tokenisation in Asia Pacific (Kapron / Chintai) A Note on Tokenization and Tokenized Assets, Ivey Publishing, W36668
11 – Oct 29	**Guest Lecture: (TBC)** **Test 2**		
12 – Nov 5	**Test 2 Solutions** **Team Presentations**		**Submit the presentation on Nov 7**
13 – Nov 12	**Misc Topics:**		

POST-SEMESTER CONTINUING LEARNING (SELF-STUDY TOPICS FOR ADVANCED STUDENTS)			
	DeFi Risks		DeFi and the Future of Finance, Ch. VII Harvey and Rabetti (2023) International Business and Decentralized Finance
	Crypto Valuation		Catalini and Wu (2023) Do Crypto Prices Actually Mean Anything? HBR, January Harvey et al (2023) Investors' Guide to Crypto Liu et al (2024) Technology and Cryptocurrency Valuation Catalini and Gans (2023) Initial Coin Offerings and the Value of Crypto Tokens Pagnotta and Buraschi (2021) An Equilibrium Valuation of Bitcoin and Decentralized Network Assets
	DeFi Option Vaults		An Explanation of DeFi Options Vaults (DOVs), QCP Capital, 2021 Best Practices for Building Decentralized Option Vaults - Pt 1, Paradigm Insights, 2022 The Inner Workings of DeFi Option Vaults (DOVs), Delphi Digital, 2022 DeFi Option Vaults | Risks and Rewards in a Convex World, Two Prime, 2022

READINGS

Required Book

- Cam Harvey et al., **DeFi and the Future of Finance** (2021)

Introductory Materials and Non-Technical Short Videos:

- Explain Bitcoin Like I'm Five
- Blockchain explained [6 minutes]
- The Essence of How Bitcoin Works [5 minutes]
- Introduction to Bitcoin [37 minutes]
- Warren Buffett: Bitcoin Is An Asset That Creates Nothing | CNBC [6 minutes]
- Chamath Palihapitiya: I Am A Buffett 'Disciple' But He's Wrong About Bitcoin | CNBC [5 minutes]

Required case studies

- Yuser: Funding Start-up Growth with Token Issuance?, Ivey 9B20N038
- ADDX's Tokenization Dilemma, NUS

Technical videos

- How Bitcoin Works Under the Hood [22 minutes]
- How Bitcoin Works in 5 Minutes [5 minutes]
- Ever wonder how Bitcoin (and other cryptocurrencies) actually work? [26 minutes]

Additional Books

- Chris Bruniske and Jack Tatar, **Cryptoassets: The Innovative Investor's Guide to Bitcoin and Beyond** (2017)
- Arvind Narayanan et al., **Bitcoin and Cryptocurrency Technologies**, (2016).
    a) A full pre-publication draft can be downloaded for free: https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf
- Alex Tapscott, **Web3: Charting the Internet's Next Economic and Cultural Frontier**, (2023)

Additional case studies (most available on Ivey Publishing)

- An Introduction to Blockchain, UVA-F-1810
- The Economics of Cryptocurrency, UVA-GEM-0190
- Bitcoin: Investment or Illusion, UVA-F-1819
- Getting Rich on Crypto, Ivey UVAQA0897
- The DAO Hack: A Blockchain Dilemma, Ivey 9B20E017
- Visa Inc.: Threat from Cryptocurrency?, Ivey 9B20M038
- Filecoin's ICO, ABCC-2018-014
- Digital Dollars, UVAGEM0197
- Tezos: Governance in the Cryptocurrency World, F&A0549
- China Merchants Bank: Light Banking, Payments and Blockchain, Ivey 9B20N024
- R3 Corda: A Distributed Ledger Technology for Financial Services, Ivey
- TokenFunder: Democratizing Funding and Investing with Blockchain, Ivey 9B18M186
- Terra and Luna(cy): The Tale of a Stablecoin
- A Note on China's Approach to Cryptocurrency and Blockchain Application in the Games Industry: Coco Game Currency, Ivey 9B20M071
- Dianrong: Marketplace Lending, Blockchain, and "The New Finance" in China, HBP 218043-PDF-ENG
- fidentiaX: The Tradable Insurance Marketplace on Blockchain, HBP 219116-PDF-ENG
- Fluidity: The Tokenization of Real Estate Assets, HPB 219057-PDF-ENG

Additional readings (most available on my website)

- Behind the Cryptomania, the Secret Sauce is Blockchain Technology
- Deciphering the cryptic world of Initial Coin Offerings
- How Can Initial Coin Offerings Reinvent Themselves?
- Can Security Token Offerings Save Crypto Fundraising?
- Distributed ledger technology in payment, clearing and settlement: An analytical framework, BIS
- G7 Working Group on Stablecoins: Investigating the impact of global stablecoins
- Behind the Scenes of Central Bank Digital Currencies, IMF FinTech Notes
- Centralized Money in a Decentralized World
- How China's Digital Currency and Facebook's Libra impact monetary policies
- The Transformative Nature of Blockchain–Based Smart Contracts
- Tokenization: Merging of traditional and digital finance
- Navigating the Next Wave of Blockchain Innovation: Smart Contracts
- Decentralized Finance in a Centralized World
- Blockchain and the Decentralization Revolution, JPMorgan, 2018

Additional papers for advanced students (most available on SSRN or Google Scholar)

- Nick Szabo, The idea of smart contracts, 1997
- Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, 2009
- E Lyandres, B Palazzo, D Rabetti, ICO success and post-ICO performance, Management Science, 2021
- Y Liu, A Tsyvinski, X Wu, Common risk factors in cryptocurrency, The Journal of Finance 77 (2), 1133-1177, 2022
- Y Liu, A Tsyvinski, Risks and returns of cryptocurrency, The Review of Financial Studies 34 (6), 2689-2727, 2021
- I Makarov, A Schoar, Cryptocurrencies and Decentralized Finance (DeFi), NBER, 2022
- J Lee, CA Parlour, Consumers as financiers: Consumer surplus, crowdfunding, and Initial Coin Offerings, The Review of Financial Studies 35 (3), 1105-1140, 2022
- J Lee, CA Parlour, U Rajan, An Introduction to Cryptocurrencies, The Palgrave Handbook of Technological Finance, 79-93, 2021
- AS Hu, CA Parlour, U Rajan, Cryptocurrencies: Stylized facts on a new investible instrument, Financial Management 48 (4), 1049-1068, 165, 2019
- Liu, Tsyvinsky, and Wu, Accounting for Cryptocurrency Value, (wp, 2022)
- Cong, Karolyi, Tang, and Zhao, Value Premium, Network Adoption, and Factor Pricing of Crypto Assets, (wp, 2022)
- Shams, The Structure of Cryptocurrency Returns, (wp, 2022)
- Catalini and Wu, Do Crypto Prices Actually Mean Anything? HBR, January, 2023
- Harvey et al, Investors' Guide to Crypto
- Cong, Lin; Li, Ye; Wang, Neng, Tokenomics: Dynamic Adoption and Valuation, Review of Financial Studies. 34.3 (2021): 1105-1155
- Cong, Lin; Li, Ye; Wang, Neng, Token-based Platform Finance, Journal of Financial Economics, 2022, 144(3), pp. 972-991.
- Cong, Lin; Yizhou Xiao, Information Cascades and Threshold Implementation: Theory and an Application to Crowdfunding, Journal of Finance, 2022
- Liu et al, Technology and Cryptocurrency Valuation: Evidence from Machine Learning, 2022

Academic Honesty & Plagiarism

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.

Artificial Intelligence (AI) tools such as ChatGPT do not require specialist knowledge to use. Many of these AI tools are commonly used in social media, for example, to create content and disguise and refine content created from programmes like ChatGPT. We understand that students will be drawn to using these AI Tools, as they would for any other electronic aid.

However, to be clear, normal academic rules still apply. As noted in the Code of Student Conduct:

"*The University takes a strict view of cheating in any form, deceptive fabrication, plagiarism and violation of intellectual property and copyright laws. Any student who is found to have engaged in such misconduct is subject to disciplinary action by the University*.

With respect to AI tools (e.g., ChatGPT and image generation tools), your instructor will clarify whether the use of these tools as inputs into your assignment development process is acceptable. AI is a technology that requires skill to use, and knowledge about when and how to use it. If you use ChatGPT or any other such AI tool in your work, you must provide a proper representation of how you used the tool and what prompts you used to generate output. Failure to cite its use constitutes academic misconduct.

Further, as with any information source, be aware that minimal efforts yield low quality results. You will need to refine your work and fact check the output, as you would double-check information from any source. Further, you should be selective in how and when you use such tools instead of using it for each and every assignment you create.

To summarise:

1. Always check with your instructors on what are the permitted uses of AI tools.
2. Have a discussion at the start of a course about the use of AI.
3. Where permitted, acknowledge your use of AI.
4. You remain responsible for the quality of your work and its appropriate representation.
5. Failure to follow the above steps can lead to a concern about plagiarism (academic dishonesty).

As always. 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 entirely your own work. This is a minimum standard.

Additional guidance can be found at:
Admission Condition: http://www.nus.edu.sg/registrar/administrative-policies-procedures/acceptance-record#NUSCodeofStudentConduct
NUS Code of Student Conduct: http://nus.edu.sg/osa/resources/code-of-student-conduct
Academic Integrity Essentials: https://libguides.nus.edu.sg/new2nus/acadintegrity#s-lib-ctab-22144949-4
Guidelines on the Use of AI Tools For Academic Work: https://libguides.nus.edu.sg/new2nus/acadintegrity#s-lib-ctab-22144949-3