Course Outline

Course : The NUS BBA
Course Code : FIN4721
Course Title : AI, Blockchain and Quantum Computing
Class Date : From 11/8/2025 To 16/11/2025
Semester : Semester 1, Academic Year 2025/2026
Location : SA1 Wed 8.30-11.30am @ BIZ1 #03-01
SA2 Thurs 3:00-6:00pm @ BIZ2 #05-11
SA1: Aug 13, 20, 27, Sep 3, 10, 17, Oct 1, 4(Sat Quiz), 8, 11(Sat), 15, 22, Nov 1(Sat Quiz)
SA2: Aug 14, 21, 28, Sep 4, 11, 18, Oct 2, 4(Sat Quiz), 9, 14, 18(Sat), 23, Nov 1(Sat Quiz)
Note that there are two Saturdays for quizzes and one Saturday for makeup.
11 and 18 Oct Saturday classes are in BIZ2#05-11.
Faculty : Prof David Lee Kuo Chuen (DL); Dr Wang Zhiguo
Department : Finance
Email : DavidLee@nus.edu.sg; zhiguo.w@nus.edu.sg
Note : Emphasis on AI, videos, hands-on experiences, group presentations and applications.
Linkedin Profiles: https://www.linkedin.com/in/david-lee-kuo-chuen-%E6%9D%8E%E5%9B%BD%E6%9D%83-07750baa/

Overview

This course provides a comprehensive framework and analysis of the latest technological advancements in the financial and insurance sectors, including emerging technologies like AI, Blockchain, Cloud & Cyber Security, Data Analytics, Environmentally Friendly Technology, Financial Inclusion, 5G, and Quantum Computing (ABCDEFG-Q). It aims to enhance students' technology literacy and equip them with the tools to critically evaluate inclusive FinTech, Generative AI, and open metaverse projects in a trustless world. The class leverages technology to provide lectures through recorded videos, discussions, AI and quizzes.

Module Objectives

Upon completion of the course, students will be able to:

- Grasp the underlying design principles behind technology.
- Evaluate inclusive fintech projects with a critical eye.
- Appreciate the social and business implications of technology.
- Possess the technical skills necessary to address the needs of underserved communities.
- Apply learned techniques to real-world scenarios.

Rules and Expectations

1. Students are expected to have their computers (laptops preferred) with them during lectures and actively engage in in-class discussions.
2. Video presentations may be shown, and questions can be addressed in class.
3. This course fosters a peer-to-peer and decentralised learning environment, encouraging maximum student interaction and collaboration.
4. To benefit from the course, regular and active participation in online/F2F discussions is crucial.
5. The two-track lectures on AI and Blockchain may run alternatively, depending on the professors' schedules.
6. Please note that if you miss the lessons, you will find it difficult to follow. If you cannot attend all the lessons, please avoid taking this course as students have failed the course.
7. If you miss the lessons, you are advised to read the Chapters as almost all the PPTs are from books. The video links will also help you if given. There should be more than enough materials in the books to help you catch up.

8. This is not an easy course for those not interested in a career in Fintech and there were students who did not pass, especially those who failed to attend the classes. We re-emphasise that If you cannot attend all the classes, we do not encourage you to take this course!

Assessment

Assessment Components	Weightage
Weekly Learning Log (5), Weekly Group PPT (5), End of Class Quiz, Chat Discussion and Verbal Participation (5)	15
Group Project	30
Mid-Term Quiz	30
Final Quiz	25

Schedule and Outline

Lesson/ Week starting	Session: WZG (lesson summary or outline / learning objectives/preparation/cases & assignments/follow-up readings & resources) There may be guest speakers, hands-on and/or group discussions every lesson. The syllabus may be updated to the latest information in line with the market.	Session: DL (lesson summary or outline / learning objectives/preparation/cases & assignments/follow-up readings & resources) There may be guest speakers, hands-on and/or group discussions every lesson. The syllabus may be updated to the latest information in line with the market.	References (If you are unfamiliar with the technical terms, reading these materials will help you bridge the gap. If you can read it before the class, it will help.)
1 11 Aug	WZG1: **GenAI and its applications**		
2 18 Aug	WZG2: **Industrial Impacts of GenAI**		
3 25 Aug	WZG3: **Deep learning basics**		
4 1 Sep	WZG4: **LLMS for business**		
5 8 Sep	WZG5: **prompt engineering**		
6 15 Sep	WZG6: **custom GPT and AI agents**		
7 29 Sep		DL7: **Bitcoin Design Thinking (cont.)** Hash, PKI, Digital Signature, UTXO, PoW (To Submit both Study Log and Group PPTs)	**Lecture Notes BSC: C7** **Case 7**
8 **Midterm** 4 Oct (Sat) 9-10.30am for both SA1 and SA2		**Venue: LT16** **Mid-Term** 30 Multiple Choice Questions Online Exemplify Test, Open Book, Open Access in 90 minutes from AI 1-3 and Blockchain 1 (week 1&2)	Instructional Word File on Preparation for blockchain lesson.

11-12pm		DL8: **Industry Talk** Take-home: Self-Learning Metamask Wallet (Free Testnet Coin Preparation) (To Submit Study Log on Industry Talk)	
9 6 Oct		DL9**: Bitcoin Design Thinking (cont.)** Hash, PKI, Digital Signature, UTXO, PoW (To Submit both Study Log and Group PPTs)	**Lecture Notes** **BSC: C1-2** **FF: C15-18** **Case 8**
10 SA1: 11 Oct, Sat 9am-12pm SA2: 13 Oct		DL10**: Ethereum** PoS, Smart Contracts, EOA, Contract Account, MetaMask Wallet (To Submit both Study Log and Group PPTs) 11 and 18 Oct Saturday classes are in BIZ2#05-11.	**Lecture Notes** **Case 9**
11 SA1: 13 Oct SA2: 18 Oct, Sat 10am-1pm		DL11**: Fungible and Non-Fungible Tokens and Hands-On, Use Cases** ERC20, ERC721, ERC1155, ERC3525 and other tokens **DeFi** DeFi Application, Cross Chains, DAO and Voting **Quantum Computing** Quantum Hardware, Software, Algorithms and Applications, Valuation Methods for Fintech and Asset Allocation. Trump Meme Coin and Policy Under His Administration. (To Submit both Study Log and Group PPTs) 11 and 18 Oct Saturday classes are in BIZ2#05-11.	**Lecture Notes** **Case 10 and 11**
12 20 Oct	WZG12**: Introduction to Metaverse**		
13 and Final 1 Nov (Sat) 9-10.30am for both		**Venue: HSS Auditorium** **Final Test** of 25 MCQs, Exemplify, open book with no internet access in 75 minutes for Lectures from AI 4-5 and Blockchain 1-5.	

SA1 and SA2 11am-12 noon		DL13: **Industry talk**	

General Guide & Reading

Updated course outline and reading will be given when term begins.

Main Text and Reading

1. "Inclusive FinTech: Blockchain, Cryptocurrency and ICO", David Lee Kuo Chuen and Linda Low, World Scientific. Topics 1 to 6, 8 and 9. (**IF**)
2. "AI and Quantum Computing for Finance and Insurance", Paul Schulte and David Lee Kuo Chuen, World Scientific. Topics 10, 11, and 12. (**AIQC**)
3. "Artificial Intelligence, Data and Blockchain in a Digital Economy", David Lee Kuo Chuen, World Scientific. Topics 2, 7, 8, and 11. **(AIDB)**
4. "Blockchain and Smart Contracts". Lo Swee Won, Cheryl Wang and David Lee Kuo Chuen, World Scientific, Topics 1-7 **(BSC)**
5. "Foundations for Fintech" David Lee Kuo Chuen, Joseph Lim, Phoon Kok Fai, Wang Yu, Global Fintech Institute – World Scientific Series on Fintech **(FF)**
6. "Applications and Trends in Fintech I", David Leek Kuo Chuen, David Lee Kuo Chuen, Joseph Lim, Phoon Kok Fai, Wang Yu, Global Fintech Institute – World Scientific Series on Fintech **(ATF)**
7. "Fintech for Finance Professionals", David Leek Kuo Chuen, David Lee Kuo Chuen, Joseph Lim, Phoon Kok Fai, Wang Yu, Global Fintech Institute – World Scientific Series on Fintech **(FFP)**

Reading (To Supplement and as ideas for Group Presentations)

1. "Emergence of FinTech and the LASIC Principles", David Lee Kuo Chuen and Ernie Teo, Journal of Financial Perspectives, Vol. 3, No. 3, 2015 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2668049
2. "Handbook of Blockchain, Digital Finance, and Inclusion: Cryptocurrency, FinTech, InsurTech, and Regulation", David Lee Kuo Chuen, RH Deng – 2018
3. "Handbook of Blockchain, Digital Finance, and Inclusion: ChinaTech, Mobile Security, and Distributed Ledger", David Lee Kuo Chuen, RH Deng – 2018 (**HB**)
4. "CRypto IndeX", 2015, by Wolfgang Hardle and Team and initiated by David Lee Kuo Chuen, https://thecrix.de/
5. Decentralisation and Distributed Innovation: Fintech, Bitcoin and ICO's, David Lee, 2018, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3107659
6. The New Money: The Utility of Cryptocurrencies and the Need for a New Monetary Policy, David Lee and Ernie Teo, 2019, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3608752
7. Blockchain Use Cases for Inclusive FinTech: Scalability, Privacy, and Trust Distribution, David Lee and Caroline Lim, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3629135
8. Fintech Tsunami: Blockchain as the Driver of the Fourth Industrial Revolution, David Lee, 2017, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2998093
9. Libra: It is a fine balance, David Lee and Ernie Teo, 2018, https://jupiterchain.tech/facebook-libra/
10. Blockchain and Inclusion, David Lee, 2018, https://vinaj.com/spotlight-series/interview-with-david-lee-kuo-chuen-professor-of-fintech
11. Digital Economy and Blockchain, David Lee, 2020, http://tfageeks.com/2020/05/31/digital-economy-and-blockchain-professor-david-lee-kuo-chuen-professor-of-finance-programme-singapore-university-of-social-sciences/

12. Other articles and cases assigned

Cases
1. Ant Financial: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3052318
Robinhood and FTX
2. Trusted Third Party: https://nakamotoinstitute.org/trusted-third-parties/
3. Social Scalability:
http://unenumerated.blogspot.com/2017/02/money-blockchains-and-social-scalability.html
4. AI Ethics and Principles:
https://www.mas.gov.sg/~/media/MAS/News%20and%20Publications/Monographs%20and%20Information%20Papers/FEAT%20Principles%20Final.pdf
5. ChatGPT Research: Summarise DL5.1, and Agentic AI with Crypto
6. Crypto and Asset Allocation: ATF I, C7
7. Satoshi Nakamoto White Paper (2008): https://bitcoin.org/bitcoin.pdf
8. Smart Contract: https://nakamotoinstitute.org/the-idea-of-smart-contracts/
9. DAO Governance and Voting: Digital Currency 2nd Edition
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4442470
10. Central Bank Digital Currency: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3608752
https://www.adb.org/sites/default/files/publication/906241/central-bank-digital-currency-developments-asia-implications.pdf
11. Valuation for Fintech: PPT

Weekly Learning Log and Participation
Submit a 2-page summary in the given format, or complete a weekly group project or quiz (unless there's a short quiz/assignment at the end of class). If you miss a practice quiz for an official reason, submit a learning log to show your views on the lessons.

Each lesson will typically include a case study, and your participation and conclusions are important. Submit the summary/study log/Group Presentation by the next lecture using the provided template. This must be done for all lectures (unless the professor decides otherwise for the week) and indicate any absences in the top right corner.

Group Project
Each group will consist of x (class size divided by 10) students with a maximum of 10 groups, formed on **CANVAS** by students by the second lesson. The presentation will involve a 10-minute PowerPoint video presentation of not more than 15 slides (excluding the intro and ending page).

The students will choose a research or discussion topic on AI, Blockchain, and Quantum Computing, either from the course material or beyond, and must apply the concepts taught in the course. All references must be acknowledged on the slides, including figures, diagrams, pictures, and quotes.

Grading will be based on content and presentation flow (20%), analysis and technical expertise (20%), original charts, diagrams, infographics, and figures (50% and most important), and conclusion (10%). Those who create viral-potential infographics can score a full 50 marks.

The video presentation must be submitted online to the professor. If unsure of the topic, a 100-word proposal can be submitted to the professor (DavidLee@nus.edu.sg) by the 8th lesson. Each student will present in the video. Each Group is to ask at least one question for each video. These questions should be given to the video group and the group should answer all the questions with a maximum of 100 words for each and submit the answers online.

(Submission: 10-minute video, PPT a day before presentation at noon. Once the videos are posted, the group should have one day to ask the question by 12th April noon, and the answers to the other groups within 24 hours after the presentation.)

Mid Term Quiz
There will be an open book but no-access-to-internet mid-term test.

Final Test
An open-book and no access final will be at the end of the term.

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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. 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.** You are encouraged to use Generative and Agenic AI for your work, but whatever you use has to be declared.

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/