THE CHINESE UNIVERSITY OF HONG KONG
DEPARTMENT OF INFORMATION ENGINEERING

COURSE OUTLINE

FTEC5640 Decentralized Finance

https://blackboard.cuhk.edu.hk/ultra/courses/_272332_1/outline

1. Course description

This course provides a foundational introduction to Decentralized Finance (DeFi) with an aim to bridge decentralized/ distributed computing and finance. Students will learn about decentralized systems, distributed consensus, blockchains, smart contracts, and the contrast between DeFi and traditional finance. The course starts with a brief review of the notion of money, conventional banking and payment systems. It then proceeds to cover different DeFi assets including cryptocurrencies, tokens and stablecoins. Various DeFi infrastructure technologies such as Decentralized Exchanges (DEX), Automated Market Maker (AMM) protocols, Decentralized Lending/ Borrowing protocols, and Oracles are also discussed. The course concludes with decentralized governance, DeFi risk management and best practices for DeFi security. By exploring the intricacies of DeFi ecosystems, students will gain a better understanding of the opportunities, challenges, and systemic risks associated with this emerging field.

2. Number of credit units: 3

3. Course timetable

2026-27	**Semester 1**		**Venue**
Lecture	Mondays:	1630 to 1815	SHB 801
Lecture	Tuesdays:	1530 to 1715	ELB LT1

4. Course instructor

Name:	Professor LAU Wing Cheong
Office Location:	SHB818
Telephone:	3943-8356
Email Address:	wclau@ie.cuhk.edu.hk

5. Teaching assistants: (Name, Building/Room Number, Email Address, Office hours)

	Name	**Office**	**Telephone**	**Email:**
1.	LUO Kaixuan	SHB 803	4624-6898	luokaixuan@link.cuhk.edu.hk
2.	GUO Zichuan	SHB 803	6917-6037	guo.zichuan@link.cuhk.edu.hk

6. Learning outcomes

Upon successful completion of this course, students will be able to:

1. Understand the operating principles and concepts underlying various DeFi services.

2. Explain how cryptocurrencies, tokens, and smart contracts can be used to implement different financial services.

3. Evaluate various DeFi services by analyzing their strengths, limitations, potential applications and risks.

4. Assess the potential impact of different DeFi services on the financial industry and the society.

7. Use of course website

The course website https://mobitec.ie.cuhk.edu.hk/ftec5640Fall2026/ is available for the distribution of course-related announcements, documents, lecture notes, and tutorial materials. Additionally, the course set up course discussion forums on Blackboard for students to discuss lecture-related topics. Tutors will monitor the forum daily and respond to student inquiries.

8. Teaching mode and learning activities

Inside classroom (face-to-face)

- Lectures
  - The lectures cover the principles of the course topics according to the teaching plan. Lecture notes will be uploaded to Blackboard before the lecture.
- Laboratory work
  - A number of specially designed laboratory experiments for the students to get the hands-on exploration of the course topics and conduct scientific investigations.
- Project
  - The students will be asked to design and prototype a course project of a chosen topic and give a presentation / report upon completion.

9. Teaching schedule and content

Week	Date	Topics/Content	Remarks
1	September 7, 2026	Course Admin and Overview of DeFi	
	September 8, 2026		
2	September 14, 2026	Blockchain fundamentals and Bitcoin	
	September 15, 2026		
3	September 21, 2026	Hands-on Tutorial on Blockchain Basics	

	September 22, 2026		
4	September 28, 2026	Ethereum and Smart Contracts	
	September 29, 2026		
5	October 5, 2026	Ethereum and Smart Contracts	
	October 6, 2026	Hands-on Tutorial on Ethereum Mechanics and Solidity Programming	
6	October 12, 2026	Distributed Consensus; Proof-of-Stake in Ethereum	
	October 13, 2026		
7	October 20, 2026	Infrastructure in Traditional Finance	
8	October 26, 2026	Stablecoins (Part I)	
	October 27, 2026		
9	November 2, 2026	Lending & Borrowing Protocols; Stablecoins (Part II)	
	November 3, 2026		
10	November 9, 2026	Decentralized Exchange (DEX) and Automated Market Maker (AMM)	
	November 10, 2026		
11	November 16, 2026	Oracles	
	November 17, 2026		
12	November 23, 2026	Tokenizations: NFT, RWA	
	November 24, 2026		
13	November 30, 2026	DeFi Regulatory Landscape; Future Directions	
	December 1, 2026		
14	December 7, 2026	Overflow	
15	December 15, 2026	Tentative Date for Final Exam	Time: 3:30PM—6:30PM; Venue: TBA

10. Assessment type, percentage, policies and rubrics

Assessment type	Weighting (%)	Remarks
▪ Assignments/Labs (4-5 sets)	25	
▪ Project	10	
▪ Class Participation	5	
▪ Final Examination	60	
	100	

Tentative Exam Date:
The Tentative Final Exam date of the course is Dec 15 (Tue), 3:30pm to 6:30pm.

Policy for Late submission:
- NO late submission will be accepted.

Policy for Absence from examinations:
- For examinations arranged by course instructor:
  - ***Absence due to*** medical reasons ***on exam/test day***: submit valid medical proof issued by registered medical doctor in Hong Kong to course instructor within 2 calendar days after the exam/test date.
  - No make-up exam or special arrangements will be arranged if the above requirements are not met.
  - Final decision will be made by the course instructor.

Grade Descriptors:

A
EXCELLENT – exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.
B
GOOD – good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.
C
FAIR – adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.
D
MARGINAL – performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.
F
FAILURE – performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

11. Required and recommended readings

Recommended readings

1. Sam M. Werner, Daniel Perez, Lewis Gudgeon, Ariah Klages-Mundt, Dominik Harz, William J. Knottenbelt, “SoK Decentralized Finance (DeFi),” Procs. of the 4th ACM Conference on Advances in Financial Technologies (AFT), 2022.
2. Kaihua Qin, Liyi Zhou, Yaroslav Afonin, Ludovico Lazzaretti, Arthur Gervais, “CeFi vs. DeFi - Comparing Centralized to Decentralized Finance,” 2021 Crypto Valley Conference on Blockchain Technology (CVCBT), arXiv:2106.08157.
3. Fabian Schär, “Decentralized Finance: On Blockchain and Smart Contract-Based Financial Markets,” Federal Reserve Bank of St. Louis Review, Feb 2021.
4. Michael McLeay, Amar Radia, Ryland Thomas, “Money in the Modern Economy: An Introduction,” Bank of England Quarterly Bulletin 2014 Q1.
5. Michael McLeay, Amar Radia, Ryland Thomas, “Money Creation in the Modern Economy,” Bank of England Quarterly Bulletin 2014 Q1.
6. Arvind Narayanan, Joesph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, Bitcoin and Cryptocurrency Technologies - A Comprehensive Introduction, Princeton University Press, 2016
7. Andreas M. Antonopoulos, Mastering Bitcoin, 2nd Edition, Published by O’Reilly, July 2017
8. Andreas Antonopoulos, Gavin Wood, Mastering Ethereum - Building Smart Contracts and DApps, Published by O’Reilly, 2018.
9. Jiahua Xu, Nazariy Vavryk, Krzysztof Paruch, Simon Cousaert, “SoK: Decentralized Exchanges (DEX) with Automated Market Maker (AMM) protocols,” ACM Computing Surveys, Vol. 55, No. 11, Feb 2023.
10. Lewis Gudgeon, Sam Werner, Daniel Perez, William J. Knottenbelt, “DeFi Protcols for Loanable Funds: Interest Rates, Liquidity and Market Efficiency,” Procs. of the 2nd ACM Conference on Advances in Financial Technologies (AFT), 2020.
11. Ariah Klages-Mundt, Dominik Harz, Lewis Gudgeon, Jun-You Liu, Andreea Minca, “Stablecoins 2.0: Economic Foundations and Risk-based Models,” Procs. of the 2nd ACM Conference on Advances in Financial Technologies (AFT), 2020.

Additional readings and resources will be provided throughout the course.

12. Feedback for evaluation

Students are encouraged to give comments and make suggestions using the following channels:

1. There are two course evaluations - one before the mid-term, and one at the end of the course. This is a formal channel for students to rate the teacher, the course, and the course tutors. Students can give specific comments or suggestions in addition to the numeric ratings.
2. Students can provide feedbacks using informal channels, such as email, or simply by discussing with the tutors or the instructor directly.

13. Academic honesty and plagiarism

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at

http://www.cuhk.edu.hk/policy/academichonesty (CUHK)
https://www.erg.cuhk.edu.hk/erg/AcademicHonesty (Engineering Faculty)

With each assignment, students will be required to submit a signed **declaration** (Attachment) that they are aware of these policies, regulations, guidelines and procedures.

- In the case of group projects, all members of the group should be asked to sign the declaration, each of whom is responsible and liable to disciplinary actions, irrespective of whether he/she has signed the declaration and whether he/she has contributed, directly or indirectly, to the problematic contents.

- For assignments in the form of a computer-generated document that is principally text-based and submitted via VeriGuide, the statement, in the form of a receipt, will be issued by the system upon students' uploading of the soft copy of the assignment.

- Students are fully aware that their work may be investigated by AI content detection software to determine originality.

- Students are fully aware of the AI approach(es) adopted in the course. In the case where some AI tools are allowed, students have made proper acknowledgment and citations as suggested by the course teacher.

Assignments without a properly signed declaration will not be graded by teachers.

Only the final version of the assignment should be submitted via VeriGuide.

The submission of a piece of work, or a part of a piece of work, for more than one purpose (e.g. to satisfy the requirements in two different courses) without declaration to this effect shall be regarded as having committed undeclared multiple submissions. It is common and acceptable to reuse a turn of phrase or a sentence or two from one's own work; but wholesale reuse is problematic. In any case, agreement from the course teacher(s) concerned should be obtained prior to the submission of the piece of work.

The copyright of the teaching materials, including lecture notes, assignments and examination questions, etc., produced by staff members/ teachers of The Chinese University of Hong Kong (CUHK) belongs to CUHK. Students may download the teaching materials produced by the staff members/ teachers from the Learning Management Systems, e.g. Blackboard, adopted by CUHK for their own educational use, but shall not distribute/ share/ copy the materials to a third-party without seeking prior permission from the staff members/ teachers concerned.

14. Use of Generative Artificial Intelligence (AI) Tools in Teaching, Learning and Assessment

Approach adopted in this course is **Approach 2** - Use of some AI tools is allowed with prior permission**:**

If teachers find it appropriate for students to use some AI tools in some in-class activities and assignments, students should be clearly informed of (1) which AI tools are allowed; (2) when, how and why these tools can / cannot be used; and (3) how the tools should be cited and acknowledged. Students should also be informed of the limits and appropriate use of these tools.

Use of some AI tools is allowed

Students may use some AI tools in some in-class activities and assignments on the following conditions:

1. The AI tools to be used are restricted to the following tools: (*Specify the AI tools that are allowed. Teachers may also specify which AI tools are not allowed*) ;

2. The specified AI tools will only be allowed for the following types of class activities and assignments: (*Specify the activities and / or assignments*)
3. Collaboration of AI tools is only allowed for the following purposes / tasks: (*Specify the purposes / tasks for which the AI tools can be used or used with certain restrictions, if any*);
4. The input contributed by the AI tools are properly acknowledged and cited ; and
5. The input together with the prompts used to elicit the AI responses should be highlighted or included as appendices wherever appropriate.

Acknowledging support from AI tools
Students are required to acknowledge all functional uses of a generative AI tool and cite it when they paraphrase, quote, or incorporate into their own work any content (whether it is text, image, data, or other format) that was created by it.

i. An example of acknowledgement

'I acknowledge the use of (name of AI tool – e.g. ChatGPT (https://chat.openai.com/) to (specify the support, e.g. plan my essay, generate some ideas for the content, ask for examples of data collection instruments, get the dates of historical events, etc.).

ii. An example of citation
OpenAI. (2023). *ChatGPT* (Mar 20 version). https://chat.openai.com/chat

(Students are reminded that due to the rapid developments of generative AI tools, some citation formats may be updated regularly.)

iii. An example of including texts generated by an AI tool in their work

"The following text was generated by an AI tool / language model (ChatGPT):"
[Insert the text generated by ChatGPT here.]

iv. An example of including texts generated by an AI tool and the prompts that were used to elicit the text from the AI tool

"[The prompt], as generated by an AI language model (ChatGPT):"
[Insert the text generated by ChatGPT in response to the prompt.]

Students are reminded to learn and use the AI tools responsibly and ethically and be aware of the limitations.

Students are reminded to clarify with the course teacher and obtain permission if necessary when in doubt.

15. Guideline on sharing lecture recordings

Attention is drawn to the following:
- The copyright of any lecture recordings shared in the course, whether they are produced by teachers, students, or peer note-takers, belongs to the University.
- Students should not share these recordings with others without obtaining prior written consent from the teacher(s).

Attachment

Declaration for written assignment

I am/we are submitting the assignment for:
□ an individual project or
□ a group project on behalf of all members of the group. It is hereby confirmed that the submission is authorized by all members of the group, and all members of the group are required to sign this declaration.

I/We declare that: (i) the assignment here submitted is original except for source material explicitly acknowledged/all members of the group have read and checked that all parts of the piece of work, irrespective of whether they are contributed by individual members or all members as a group, here submitted are original except for source material explicitly acknowledged; (ii) the piece of work, or a part of the piece of work has not been submitted for more than one purpose (e.g. to satisfy the requirements in two different courses) without declaration; and (iii) the submitted soft copy with details listed in the <Submission Details> is identical to the hard copy(ies), if any, which has(have) been / is(are) going to be submitted. I/We also acknowledge that I am/we are aware of the University's policy and regulations on honesty in academic work, and of the disciplinary guidelines and procedures applicable to breaches of such policy and regulations, as contained in the University website http://www.cuhk.edu.hk/policy/academichonesty/.

In the case of a group project, we are aware that all members of the group should be held responsible and liable to disciplinary actions, irrespective of whether he/she has signed the declaration and whether he/she has contributed, directly or indirectly, to the problematic content.

I/we declare that I/we have not distributed/ shared/ copied any teaching materials without the consent of the course teacher(s) to gain unfair academic advantage in the assignment/ course.

I/we declare that I/we have read and understood the University's policy on the use of AI for academic work. I/we confirm that I/we have complied with the instructions given by my/our course teacher(s) regarding the use of AI tools for this assignment and consent to the use of AI content detection software to review my/our submission.

I/We also understand that assignments without a properly signed declaration by the student concerned and in the case of a group project, by all members of the group concerned, will not be graded by the teacher(s).

_____	_____
Signature(s)	Date
_____	_____
Name(s)	Student ID(s)
_____-____	_____
Course code	Course title