The Hong Kong University of Science and Technology

IEDA 4000J Blockchain and Web3 (Spring 2026) Syllabus

Blockchain and Web3

IEDA 4000J

3 Credits

Pre-requisite course: IEDA 3560

Instructor: Zhang, Liang

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Office Hours: Wednesday 5pm – 6pm

Teaching Assistant: TBA

Email: TBA

Office Hours: TBA

Course Description

This course introduces students to the foundations, mechanisms, and emerging frontiers of blockchain technology and Web3 ecosystems. Beginning with an introduction to the historical context and motivations behind decentralized systems, the course explores the basic cryptographic tools—such as hashing and digital signatures—that secure blockchain networks. Students will study the Nakamoto consensus and its role in enabling trustless coordination, followed by an examination of peer-to-peer networks and the architecture of the Bitcoin system. The course then addresses critical challenges of security and scalability, analyzing attacks, throughput limitations, and protocol trade-offs. Building on these foundations, students will gain hands-on exposure to the Ethereum platform, smart contracts, and decentralized applications. The curriculum expands into Web3 and new trends, including decentralized finance (DeFi), DAOs, NFTs, DEXs and cross-chain interoperability. Practical case studies highlight blockchain applications in voting systems, auction mechanisms, and incentive design. Toward the end of the course, students will engage with open problems and potential solutions, preparing them to contribute to ongoing research and innovation.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Understand the principles of blockchain and Web3 technologies for decentralized systems.
2. Develop decentralized applications (dApps) related to decision making and game theory.
3. Apply blockchain solutions to enhance transparency and automation in supply chain and data management.
4. Design and deploy smart contracts using Solidity on the Ethereum blockchain.
5. Evaluate the security, scalability, and ethical implications of blockchain-based systems.

Assessment and Grading

Assessment Task	Contribution to Overall Course grade (%)	Tentative Due date
Homework (Problem Sets)	30%	Usually within one week
Midterm	40%	March 20, 2026 (in class, closed book, no make-up)
Project Proposal	10%	April 10, 2026
Project Progress Report	10%	April 24, 2026
Final Report + Presentation	10%	Presentation in class: May 6/8, 2026 Report: May 15, 2026

Final Grade Descriptors:

In accordance with the Guidelines for Use of Undergraduate Course Grade Distribution Bands (April 2020), the final grade descriptors are presented below.

Grade	Grade Descriptor	Broad criteria achieved	Guideline
A	Excellent Performance	Comprehensive grasp of the subject	10-25%
B	Good Performance	Good knowledge and understanding	25-40%
C	Satisfactory Performance	Adequate knowledge and understanding	25-40%
D	Marginal Pass	Threshold knowledge of core subject	5-10%
F	Fail		0-5%

Course AI Policy

You are encouraged to use Generative AI tools. However, you are responsible for your submissions. You should write all the required codes, explanations, and documentations yourself, ensuring that your work is original, accurate, and meets the assignment requirements. AI-generated texts can make mistakes, including factual errors, incorrect logic, or misleading statements. If you choose to use AI assistance, you are responsible for reviewing, verifying, and correcting the content before submission. Any errors, omissions, or misrepresentations in your work will be treated as your own, regardless of the sources. Specifically, if the course instructor or teaching assistant suspects that Generative AI tools have been used in a submission resulting in issues such as fabricated references, nonsensical reasoning, or misinformation, the instructor reserves the right to assign a grade of zero to that submission. A second violation of this rule may result in failure of the course.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Required Texts and Materials

[1] Daniel Drescher (2017) Blockchain Basics: A Non-Technical Introduction in 25 Steps.

[2] Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder (2016) Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.