FIN587 Blockchain Technologies: Applications and Challenges

Level: 5
Credit Units: 5 Credit Units
Language: CHINESE
Presentation Pattern: EVERY JULY

Synopsis:

FIN587 Blockchain Technologies: Applications and Challenges provides students a technical understanding of how blockchain works and how it can be used to address real-world problems. The course starts with an overview of the blockchain technology and cryptocurrencies, followed with technical protocols, tools, and processes that enable decentralization and the adoption of blockchain for peer-to-peer payments and business applications. The course analyses the Bitcoin mechanism (blocks, mining, distributed consensus, and P2P network) and ecosystem (hard/soft forks, wallets, and exchanges). It then reviews the representative system for Blockchain 2.0 that is Ethereum (smart contracts, Decentralised Autonomous Organisations ("DAOs")) commonly used for industry applications. It also looks into other distributed consensus mechanisms and evaluates the core principles behind the design of consensus mechanisms. The latter part of the course focuses on advanced blockchain design thinking and challenges such as the issues of centralization vs decentralization, trusted third party, oracles, fintech valuation, technical and social scalability and interoperability. The course employs case studies, hands-on programming and projects to help students form a critical understanding of how blockchain technologies can be applied to both financial and nonfinancial areas, as well as the challenges and questions that still need to be addressed.

Overall, the course is aimed at providing technical foundation underlying blockchain and digital currencies, and equipping students with tools and mindsets to design and develop on the blockchain and provide innovative solutions to real-world issues.

Topics:

● Technical protocols, tools, and processes: Cryptographic hashes, digital signatures, public/private keys
● Bitcoin mechanism: blocks, mining, SPV nodes, and bitcoin scripting
● Bitcoin ecosystem: hard/soft forks, wallets, exchanges, mining pools and centralization, regulation, and security
● Distributed systems and consensus mechanisms
● Ethereum, Smart contract, oracle, and DAOs
● Blockchain design thinking: centralized vs decentralized, trusted third party
● Case studies: blockchain start-ups, enterprise development, and central bank digital currencies
● Fintech and blockchain valuation
● Coding and developing applications on blockchain platforms
● Blockchain technology's challenges: technical and social scalability
● Blockchain technology's challenges: interoperability and privacy
● Possible solutions to the challenges and the future of blockchain technology

Learning Outcome:

- Appraise the development of blockchain technology, its challenges and possible solutions
- Examine technical protocols, tools, and processes underlying major blockchain applications
- Assess the design thinking behind public and private blockchain, the issues of centralization vs decentralization and their corresponding use cases
- Evaluate blockchain businesses
- Create and code applications on blockchain platforms
- Design solutions based on blockchain technologies to address real-world issues

Assessment Strategies - Regular Semester (Evening Class):

Components	Description	Weightage Allocation (%)
Overall Continuous Assessment	PARTICIPATION 1	10
	GROUP BASED ASSIGNMENT 1	40
Overall Examinable Components	ECA	50
Total		**100**

*The information listed is subject to review and change.