CIS600/FIN600: Blockchain and Cryptocurrencies

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Course Description

BitCoin/Blockchain is a disruptive technology across many industries, including banking, supply-chain, insurance, cloud, information-technology and beyond. This course teaches about the BitCoin/Blockchain technology from a practice perspective. The learning objective is for students to identify, design and develop business applications on BitCoin and Blockchain. Towards the goal, it will include lectures, case studies, labs and projects on BitCoin/Blockchain. The hands-on part of the course will be application design and development on real software (ethereum.org). It will cover Bitcoin and Blockchain in terms of their interfaces, applications and internal mechanisms.

This is a 3-credit course co-taught by Dr. Tang and Dr. Velu. The lectures will cover the Blockchain technology and applications interspersed.

Learning Objectives

Students will be able to 1) analyze existing applications on Blockchain, 2) design and development applications on Blockchain/cryptocurrency, and 3) identify new Blockchain applications in various functional areas of business. The learning goals will lead to potential startup opportunities on Blockchain.

Texts

Slides/lecture notes are required and most important!

Other optional texts

- Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, [online book]
- Mastering Ethereum: Smart contract and decentralized applications, Andreas M. Antonopoulos, Gavin Wood [online book]
- Mastering Bitcoin: Programming the Open Blockchain, Andreas Antonopoulos, [online book]

Grading

Class participation (15%), labs (50%), project/technical reviews (35% choose one)

- Late submission policy: 10% off within one day, 40% off within two days, 50% off within three days, 70% off within one week.
- All labs have to be finished individually; no collaboration will be allowed.
- No copy-and-paste is allowed in any circumstances.
- Any questions about grading should be directed to Dr. Tang. TA cannot interprete the grading policy.

Course Schedule (Tentative)

- Blockchain protocol and system
  - Transaction storage
  - Smart-contract execution platform
  - Cryptocurrency mining
- Blockchain security

    - Blockchain attack surface
    - Blockchain security analysis
- Decentralized domain applications and case studies
    - Cryptocurrency in financial applications: pricing and trading
    - Case studies: SilkRoad, CryptoKitties, Ransomware, etc.
- Labs: https://blockchainlabsu.github.io/
- Projects: selected advanced topics in Blockchain security, systems and applications.