



Course Code DFIN-511	Course Title Introduction to Digital Currencies	ECTS Credits 10
Prerequisites None	Department Business and Computer Science	Semester Fall/Spring
Type of Course Required	Field Digital Currencies	Language of Instruction English
Level of Course 2nd Cycle	Lecturer(s) Mr. Andreas Antonopoulos Mr. Antonis Polemitis Dr. Dmitry Apraksin	Year of Study 2nd
Mode of Delivery Distance Learning	Work Placement N/A	Co-requisites N/A

Objectives of the Course:

The course is designed to provide an introductory understanding of decentralized digital currencies (cryptocurrencies) such as bitcoin. In particular, the course will survey the theory and principles by which cryptocurrencies operate, practical examples of basic cryptocurrency transactions, the likely interaction of cryptocurrencies with the banking, financial, legal and regulatory systems, and how cryptocurrencies could be viewed within a framework of innovation and development.

The course will consist of four general topics:

1. Theoretical introduction to digital currencies: This will include the history of digital currencies, the invention of decentralized consensus through proof-of-work, and a technical overview of cryptographic currencies such as bitcoin, as well as alternative/advanced uses of the blockchain.
2. Practical introduction to digital currencies: This will include practical, introductory exercises in utilizing and constructing cryptocurrency transactions.
3. Banking, financial and regulatory implications of digital currencies: Overview of how cryptocurrencies map to the existing monetary and banking system and possible approaches to regulation and development.
4. Innovation & development: How cryptocurrencies can be viewed through innovation frameworks and what possibilities exist for cryptocurrencies to accelerate development.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Understand the technology components of blockchain-based digital currencies, the process of currency issuance, proof-of-work, consensus and distributed ledger
2. Demonstrate an understanding of digital currencies and be able to conduct transactions from a digital currency wallet

3. Understand more advanced uses of the blockchain such as escrow services, asset registration, attestation and smart contracts
4. Understand alternatives to bitcoin, such as alt-coins, IOU-based systems and Ethereum
5. Understand what parallels and differences cryptocurrencies have with the existing monetary and banking systems
6. Understand likely frameworks for regulating cryptocurrencies
7. Be able to place cryptocurrencies in the context of disruptive innovations and understand their potential for growth or development

Course Contents:

1. A brief history of money: From sea shells to cryptocurrency
2. The Byzantine' General's Problem: What is it, why is it important in computing, and solutions over time
3. Basics of Cryptocurrency: Public/private keys, transactions, mining
4. Bitcoin in practice – Part 1: Bitcoinqt, online wallets, sending/receiving, paper wallets/cold storage
5. Bitcoin in practice – Part 2: Bitcoin, constructing a transaction, mining
6. Alternative uses of the blockchain: Colored coins, meta-coins, asset registration, attestation, smart contracts, political speech
7. Alternatives to Bitcoin: Alt-coins; Ripple / IOU Based Systems, Ethereum
8. Cryptocurrency and Central Banking: Applying the concepts of money supply, fractional reserve banking, monetary policy, fiat/commodity money to cryptocurrencies
9. Cryptocurrency and Financial Institutions: Applying the concepts of exchanges, banks, money transmitters and capital markets to cryptocurrencies
10. Regulatory and tax treatment: Potential regulatory and legal frameworks for cryptocurrencies, including classification/recognition, AML, KYC, consumer protection, and taxation
11. Cryptocurrency and innovation: Applying framework of the innovators dilemma, and competitive strategy to cryptocurrencies
12. Cryptocurrency and the developing world: Understanding cryptocurrencies' potential impact on microfinance, infrastructure development, and non-traditional payment systems (M-Pesa)

Learning Activities and Teaching Methods:

Lectures, Seminars, Assignments

Assessment Methods:

Online quizzes and problem sets, Projects, Final Examination

Recommended Textbooks / Reading:

Title	Author(s)	Publisher	Year	ISBN
Mastering Bitcoin	Andreas M. Antonopoulos	O.Reily media	2015	978-1-449-37404-4

Bitcoin: A Peer-to-Peer Electronic Cash System	Satoshi Nakamoto	Prentice Hall	2008	https://bitcoin.org/bitcoin.pdf
--	------------------	---------------	------	---

Selected Online Readings:

- <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/...moneycreation.pdf>
- <http://dealbook.nytimes.com/2014/01/21/why-bitcoin-matters/>
- <http://www.usv.com/posts/bitcoin-as-protocol>
- <http://startupboy.com/2013/11/07/bitcoin-the-internet-of-money/>
- <http://startupboy.com/2014/03/09/the-bitcoin-model-for-crowdfunding/>
- http://mercatus.org/sites/default/files/Brito_BitcoinPrimer_embargoed.pdf
- <http://www.hmrc.gov.uk/briefs/vat/brief0914.htm>
- http://fincen.gov/statutes_regs/guidance/html/FIN-2013-G001.html
- <http://www.scribd.com/doc/212058352/Bit-Coin>
- <http://bitcoinmagazine.com/9671/ethereum-next-generation-cryptocurrency-decentralizedapplication-platform/>
- <http://www.andrew.cmu.edu/course/15-749/READINGS/required/resilience/lamport82.pdf>