

MIS-536 Digital Currency Information Systems and Resources

*Does not require Programming Background



UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

Course Code MIS-536	Course Title Digital Currency Information Systems and Resources	ECTS Credits 10
Department Computer Science Management & MIS	Semester Fall/Spring/Summer	Prerequisites DFIN-511
Type of Course Elective	Field Information Systems	Language of Instruction English
Level of Course 2 nd Cycle	Year of Study 2 nd	Lecturer(s) George Giaglis
Mode of Delivery Distance Learning	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objective of this course is to provide students with a conceptual framework and applied competencies that will assist them understand, apply, assess and manage Information Systems and resources supporting the implementation or utilization of digital currencies. The course is structured around three sections:

- 1) Bitcoin Resources - important practical issues regarding the management, implementation, and future of Bitcoin, at network level and at the level of the individual user.
- 2) Blockchain Resources - topical subjects regarding the implementation of advanced applications, parallel to or beyond Digital Currencies, based on the concept of the blockchain.
- 3) Trading, discusses issues surrounding the assessment of the Bitcoin exchange rate against other currencies and resources for trading digital currency based financial products.

Learning Outcomes:

Upon completion of this course, students are expected to be able to:

1. Understand, employ, critically assess and evaluate different Information Systems and Resources used for Digital Currencies.
2. Understand and analyze principles of P2P architectures and their application in P2P currencies.
3. Perform security analysis and critically assess Digital Currency implementations.
4. Provide students with deep knowledge on Mobile services and the underlying infrastructure needed.
5. Critically assess and acquire the knowledge on Mobile Information Systems and Services.
6. Identify, describe and apply mobile and Cloud-based services in Digital Currencies.
7. Examine the Digital Currency ecosystem, identify best practices as well as opportunities for implementations or investment.

Course Contents:

1. Types of Digital Payment Systems and P2P Currencies.
2. Concepts of P2P Decentralized Architectures.
3. Fundamentals of Crypto-currencies and Security.
4. Specification and analysis of different types of Digital Wallets.
5. Requirements specifications for extending the Digital Currency ecosystem.
6. Risk Analysis for Digital Currency Exchanges.
7. Mobile Information Systems and Services in Digital Currency.
8. Cloud-based Mobile Services.
9. Alternative Digital Currencies.
10. Digital Currency Derivatives and Digital Currency Investment options.
11. Transactions and Privacy in Digital Currencies.
12. Case Studies and Best Practices in Digital Currencies.

Learning Activities and Teaching Methods:

Lectures, Webex Tutorials, Assignments and Project.

Assessment Methods:

Project, Mid-term Exam, Final Exam.

Recommended Articles / Reading List:

1. Cryptocurrency (electronic transactions without relying on trust) protocol specifications. Original Satoshi article (<http://bitcoin.org/bitcoin.pdf>)
2. Bitcoin Protocol Specifications (https://en.bitcoin.it/wiki/Protocol_specification)
3. Practical Aspects of the Bitcoin System, [Artus Krohn-Grimberghe](#) [Christoph Sorge](#) (arXiv:1308.6760)
4. Questions related to Bitcoin and other Informational Money, [Jan A. Bergstra](#), [Karl de Leeuw](#) (arXiv:1305.5956)
5. Do the rich get richer? An empirical analysis of the BitCoin transaction network, [Dániel Kondor](#), [Márton Pósfai](#), [István Csabai](#), [Gábor Vattay](#) (arXiv:1308.3892)
6. Bitcoin: a Money-like Informational Commodity, [Jan A. Bergstra](#), [Peter Weijland](#) (arXiv:1402.4778)
7. Analysis of Hashrate-Based Double Spending, [Meni Rosenfeld](#) (arXiv:1402.2009)
8. Theoretical Bitcoin Attacks with less than Half of the Computational Power (draft), [Lear Bahack](#) (arXiv:1312.7013)
9. How to deal with malleability of BitCoin transactions, [Marcin Andrychowicz](#), [Stefan Dziembowski](#), [Daniel Malinowski](#), [Łukasz Mazurek](#), (arXiv:1312.3230)
10. The False Premises and Promises of Bitcoin, [Brian P. Hanley](#) (arXiv:1312.2048)
11. Majority is not Enough: Bitcoin Mining is Vulnerable, [Ittay Eyal](#), [Emin Gun Sirer](#) (arXiv:1311.0243)
12. Bitcoin and Beyond: Exclusively Informational Monies, [Jan A. Bergstra](#), [Karl de Leeuw](#) (arXiv:1304.4758)
13. Two Bitcoins at the Price of One? Double-Spending Attacks on Fast Payments in Bitcoin (<http://eprint.iacr.org/2012/248.pdf>)