

**COMP-533 Digital Currencies in motion**  
**\*Requires Programming Background**



**UNIVERSITY OF NICOSIA**  
**ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ**

<b>Course Code</b> COMP-533	<b>Course Title</b> Digital Currencies in Motion	<b>ECTS Credits</b> 10
<b>Department</b> Computer Science	<b>Semester</b> Fall/Spring/Summer	<b>Prerequisites</b> DFIN-511
<b>Type of Course</b> Elective	<b>Field</b> Computer Science	<b>Language of Instruction</b> English
<b>Level of Course</b> 2 <sup>nd</sup> Cycle	<b>Year of Study</b> 2 <sup>nd</sup>	<b>Lecturer(s)</b> Dr. Constandinos X. Mavromoustakis
<b>Mode of Delivery</b> Distance Learning	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

**Objectives of the Course:**

The main objective of this course is to provide students with the basic concepts of the Mobile Computing technologies, Services and Protocols and the related Platforms that will assist them to realize, understand, apply, assess and manage Mobile Services and related Technologies with respect to the digital currencies.

Topic areas of the course include:

- Mobile Computing technology and Digital Currencies
- Supported Platforms for the Mobile Computing Systems (Mobility management and computation and Client/Server structures, N-tier architectures and Middleware of the mobile computing)
- Cooperative communication and resource outsourcing (existing Middlewares)
- Seamless Integration of Broadcast and the Technologies for Capacity Enhancement in Mobility Support
- MP2P Resource Exchange/Sharing (P2P) Protocols
- Mobile Peer-to-Peer (MP2P) communication and services/Wireless mining pools (case of -for example- Litecoin mining)
- Mobile caching/passive buffering, Client site caching control and Strategies for Query Processing

- Limitations in Mobile Computing and the impact on communication/Vulnerabilities and trade-offs
- Wireless resource migration for mining resource pools
- Cloud Computing and its impact on Digital Currencies
- Using Cloud-based infrastructures (case of Digital Currency as a Service)
- Case Studies in Digital Currencies and Related Mobile Platforms

### **Learning Outcomes:**

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

1. Understand, employ, critically assess and evaluate different Mobile Systems and related platforms used for Digital Currencies.
2. Understand and analyze principles of MP2P architectures and their application in Digital currencies.
3. Perform security analysis from the Mobile and Wireless perspective and critically assess Digital Currency implementations and their potential vulnerabilities.
4. Provide students with deep knowledge for Mobility management and computation and Client/Server structures, N-tier architectures and Middlewares supporting the Mobile Computing paradigm.
5. Provide students with deep knowledge on Mobile Computing and Resources for enabling reliable accommodation of the Digital Currency applicability.
6. Critically assess and acquire the knowledge on Mobile Computing and Services.
7. Provide students with knowledge for the Mobile Multimedia paradigm, and assess the Digital Currency applicability.
8. Identify, describe and apply Mobile and Cloud-based services in Digital Currencies.
9. Examine and critically assess different Mobile Systems and their response in respect to Digital Currencies.

### **Course Contents:**

1. Mobile Computing technology and Digital Currencies.
2. Supported Platforms for the Mobile Computing Systems.
3. Cooperative communication and resource outsourcing (existing Middleware).
4. Mobile Peer-to-Peer (MP2P) communication and services/Wireless mining pools.
5. Mobile caching/passive buffering, Client site caching control, mobile Proxies and Strategies for Query Processing.

6. Power limitations in Mobile Computing and the impact on communication: Vulnerabilities and trade-offs.
7. MP2P Resource Exchange/Sharing (P2P) Protocols.
8. Wireless resource migration for mining resource pools.
9. Cloud Computing and its impact on Digital Currencies.
10. Cloud-based Virtual banks and Mobile Computing (Digital Currency as a Service/DCaaS).
11. Mobile Multimedia Applications: Digital Currencies paradigm.
12. Case Studies in Digital Currencies and Related Mobile Platforms.

### **Learning Activities and Teaching Methods:**

Lectures, Webex Sessions and Tutorials, Assignments and Project.

### **Assessment Methods:**

Project, Mid-term Exam, Final Exam.

### **Recommended Reading:**

Authors	Title	Publisher	Year	ISBN
Devi Kamal, Raj Kamal	Mobile Computing (2 <sup>nd</sup> edition)	Oxford University Press, USA	2012	ISBN-10: 0198068913 ISBN-13: 978- 0198068914

*Note: There will be a selection of articles from different repositories (i.e. arxiv.org server) that will allow students to acquire the state-of-the-art knowledge in Mobile Computing technologies.*

### **Recommended Articles / Reading List:**

1. Bitcoin Protocol Specifications  
([https://en.bitcoin.it/wiki/Protocol\\_specification](https://en.bitcoin.it/wiki/Protocol_specification))
2. Practical Aspects of the Bitcoin System, [Artus Krohn-Grimberghe Christoph Sorge](#) ([arXiv:1308.6760](#))
3. Majority is not Enough: Bitcoin Mining is Vulnerable  
(<http://arxiv.org/abs/1311.0243> )
4. Theoretical Bitcoin Attacks with less than Half of the Computational Power (draft), [Lear Bahack](#) ([arXiv:1312.7013](#))
5. Bitcoin and Beyond: Exclusively Informational Monies, [Jan A. Bergstra](#), [Karl de Leeuw](#) ([arXiv:1304.4758](#))