



Course Syllabus

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|---|------------------------------|--------------------------------|
| Course Code | Course Title | ECTS Credits |
| COMP-538DL | Blockchain Applications | 10 |
| Prerequisites | Department | Semester |
| None | Computer Science | Fall/Spring |
| Type of Course | Field | Language of Instruction |
| Required for <i>Blockchain Technologies</i> concentration | Computer Science | English |
| Level of Course | Lecturer(s) | Year of Study |
| 2 nd Cycle | Prof. Marinos Themistokleous | 1 st |
| Mode of Delivery | Work Placement | Corequisites |
| Distance Learning | N/A | None |

Course Objectives:

The main objectives of the course are to:

- Critically discuss the main blockchain architectures (public, private, hybrid, cloud, etc.).
- Identify alternative distributed consensus mechanisms and comparatively evaluate them.
- Systematically analyze the horizontal and vertical application areas of blockchains, beyond digital currencies.
- Overview the landscape of existing blockchain services, including APIs, blockchain-as-a-service, industry consortia, etc.
- Discuss and analyze significant blockchain case studies and best-practice use cases.
- Discuss how blockchains, combined with other technological developments (IoT, AI, etc.), will disrupt the current status quo in money and commerce.

Learning Outcomes:

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

1. Demonstrate in-depth understanding of different blockchain types, architectures and distributed consensus methods.
2. Evaluate the potential of different blockchain types and distributed consensus methods in different use cases.
3. Critically appraise the potential of blockchain use in different application settings and scenarios.

4. Manage teams on blockchain application design and implementation.
5. Envision the disruptive potential of blockchains in the field of money and commerce.

Course Content:

This course covers the following topics:

1. Blockchain Architectures: Public, Private, Hybrid.
2. Cloud-based blockchains, sidechains and semi-decentralized blockchains.
3. Alternative consensus mechanisms (PoW, PoS, etc.).
4. Blockchain applications: financial services, digital content storage and delivery, authentication and authorization, real estate, health, prediction, proof-of-existence, IoT, etc.
5. Blockchain case studies and best practices.
6. Implications of non-reversible transactional systems.
7. The future of money and commerce in a blockchain world: money-over-IP, machine-to-machine commerce, etc

Learning Activities and Teaching Methods:

Teaching method consists of lectures, case studies, supervised labs and practical exercises (individual or team work), assignments, and coursework.

Assessment Methods:

Project, Midterm Exam, and Final Exam

Required Textbooks / Readings:

| Title | Authors | Publisher | Year | ISBN |
|--|-------------------------------|-------------------|------|----------------|
| Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business and the World | Tapscott, D. and Tapscott, A. | Portfolio Penguin | 2016 | 978-0241237854 |