



UNIVERSITÀ DI PISA
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE
Dottorato di Ricerca in Ingegneria dell'Informazione

Doctoral Course

“Blockchain for Distributed Applications”

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Short Abstract: Blockchain technology is a fascinating and relatively new technology that has been extensively studied and utilized across multiple sectors. The objective of this course is to provide a comprehensive overview of distributed ledger technologies, with a focus on the core characteristics of blockchain. This will serve as a solid foundation for building further knowledge and expertise in the field.

The course provides a comprehensive overview of the fundamental principles of blockchain, including cryptography, consensus algorithms, and smart contracts. Additionally, practical examples and use cases will be presented throughout the course, with a focus on the most well-known blockchain technologies such as Bitcoin, Ethereum, and Hyperledger Fabric. Furthermore, participants will have the opportunity to engage in practical sessions on programming smart contracts using Solidity.

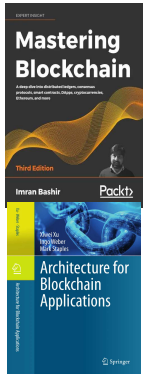
Course Contents in Brief:

- Blockchain technology in general
- Basic principles of cryptography
- Consensus algorithms
- Ethereum and smart contract development
- Hyperledger Fabric technology
- The role of the blockchain in distributed applications (NFT and Metaverse)

Total # of hours of lecture: 16 hours (4 days)

References:

- **Mastering Blockchain: A deep dive into distributed ledgers, consensus protocols, smart contracts, DApps, cryptocurrencies, Ethereum, and more, 3rd Edition; Publisher [Packt Publishing](#) Year 2020 ISBN: 9781839211379**
- **Architecture for Blockchain Applications Xiwei Xu, Ingo Weber, Mark Staples. Springer, 2019 ISBN: 978-3-030-03035-3**



CV of the Teacher

Full name: Andrea Morichetta

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Andrea Morichetta is an Assistant Professor in Computer Science at the University of Camerino and a member of the Process and Service Lab (<http://pros.unicam.it/>). He received his PhD in Computer, Decision and System science at the IMT Alti Studi Lucca. His research interests are mainly in the area of software engineering, applied to distributed systems and business process management. In the last years, Morichetta has increased his interest in distributed ledger technologies and blockchain application development, with a particular focus on model-driven approaches. He is a member of the Italian Distributed Ledger Technology group since 2018. He is the director of the 2nd and 3rd editions of the International Winter School on Blockchain Technology and Applications Hyperledger at the University of Camerino - Italy (<http://pros.unicam.it/blockchainschool/>). Morichetta is also PC chair of different workshops based on blockchain topics FOCODILE 2022 (<https://www.discotec.org/2022/focodile>) and B4TDS 2021 (<http://pros.unicam.it/b4tds2021/>) 2022 (<http://pros.unicam.it/b4tds2022/>)

Final Exam: Yes (final presentation on in-depth blockchain topics or programming project close to the student's background involving blockchain technology)

Room and Schedule

Room: *Aula Riunioni del Dipartimento di Ingegneria dell'Informazione, Via G. Caruso 16, Pisa - Ground Floor*

Schedule:

- 24/06/2024: 9:00 - 13:00 (Lesson)
- 25/06/2024: 9:00 - 13:00 (Lesson)
- 26/06/2024: 9:00 - 13:00 (Lesson)
- 27/06/2024: 9:00 - 13:00 (Lesson)
- 28/06/2024: 9:00 - 11:00 (Exam)