UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Smart Contracts, Bitcoin and Blockchain Technology

2425-1-FSG01A002

Learning objectives

- Knowledge and Understanding
  Understanding of the functioning of the main types of blockchain and smart contracts. Understending of the key legal, social, and financial implications related to the use of blockchain and cryptocurrencies.

- Applying Knowledge and Understanding
  Being able to choose the best type of blockchain for a specific purpose.

- Autonomy of Judgment
  Being able to assess the risks and potential associated with the use of blockchain-based solutions.

- Communication Skills
  Being able to interact with IT experts and administrators to understand and discuss the adoption of blockchain-based tools.

- Learning Skills
  Being able to critically evaluate new blockchain-based tools, assessing their usefulness, critical aspects, and legal implications.

Contents

Knowledge and concepts underlying the operation of blockchains, cryptocurrencies, and smart contracts. Simple practical examples of creating cryptocurrencies and smart contracts.

Detailed program

- Introduction to Blockchains: Motivations, Types of Blockchains, and Their Applications
- Transaction-Based Blockchains: Bitcoin and Other Cryptocurrencies
- Asymmetric Cryptography: Encryption, Digital Signatures, Hash Functions
- Exchanges and Wallets
- Bitcoin Scripts
- Account-Based Blockchains: Ethereum
- Differences Between Bitcoin and Ethereum Blockchains
- Cryptocurrencies: Practical Examples and Current Trends
- Introduction to Smart Contracts: What They Are, Possible Uses, and Limitations
- Tokenization: Fungible and Non-Fungible Tokens (NFTs).
- Consensus Algorithms

Prerequisites

- Basic skills in mathematics (high school level).
- Ability to read simple texts in English.

Teaching methods

- 21 lectures of 2 hours each, conducted in Italian, in person.
- Availability of lecture recordings.

Assessment methods

The assessment will be conducted through a written exam with open-ended questions. No midterm exams are planned.
The questions will be of a general nature and will aim to assess the understanding of both the theoretical aspects related to the topics covered during the course and their practical implications. It will be essential to demonstrate an understanding of the main advantages and limitations of the technologies discussed in class, as well as the ability to select the most suitable tool to support some common needs in the legal field.
Attention will also be given to the proper use of language and the ability to personally elaborate on the concepts.

Textbooks and Reading Materials

- Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press.
  Can be (legally) downloaded from: https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf

Sustainable Development Goals