UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Advanced It Skills

2526-2-F1601M070

Learning objectives

The objective of the course is to provide basic concepts about Bitcoins and crypto-currencies in general, with particular attention to the cryptographic aspects.

Knowledge and understanding
Students will acquire a solid foundational knowledge of the core principles of cryptocurrencies, with particular focus on how Bitcoin works. They will also understand the mathematical and theoretical concepts underpinning the cryptography used in blockchain systems.

Applying knowledge and understanding
Students will be able to apply their knowledge to analyze and understand the technical functioning of a cryptocurrency, identify the cryptographic security mechanisms employed, and assess the structure of the underlying protocols.

Making judgements
Students will develop the ability to critically evaluate the theoretical and practical implications of cryptographic technologies applied to cryptocurrencies, recognizing the advantages, limitations, and potential vulnerabilities of decentralized systems.

Communication skills
Students will be able to clearly and effectively present key concepts related to cryptocurrencies and cryptography, using appropriate technical language, both in academic contexts and in broader discussions.

Learning skills
Students will develop the conceptual tools necessary to independently explore advanced topics in cryptography, blockchain technologies, and the evolving landscape of cryptocurrencies.

Contents

Cryptocurrencies and cryptography.

Detailed program

Introduction, what is Bitcoin? Basic concepts

Storing Bitcoins Safely, Securely, Conveniently

Buying Bitcoins

The cryptography behind Bitcoins

Bitcoin mining

Altcoins and the use of cryptocurrencies as an asset class to diversify investment portfolios

Prerequisites

No specific prerequisites.

Teaching methods

Lectures.

Approximately 70% of the teaching will be delivered through traditional lectures. The remaining 30% of the total hours will be conducted in an interactive format, including ongoing assessments of students' understanding of the topics covered, practical applications with MATLAB, and the use of Bloomberg.

Except for any unforeseen issues (such as strikes and/or instructor unavailability), teaching activities will be conducted in person.

Assessment methods

Written exam with open questions.

Textbooks and Reading Materials

Textbooks will be suggested during the lectures.

Slides of the lectures.

Semester

First term.

Teaching language

Italian

Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE