



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Blockchain and Digital Finance

2627-3-E1805M021

Learning objectives

Knowledge and understanding

The course provides students with a solid knowledge of alternative finance instruments and of the technologies and processes underlying cryptocurrencies. In addition to the fundamentals of entrepreneurial finance, the course explores in depth fully digitalised instruments (crowdfunding and token offerings) and the technological mechanisms of the crypto ecosystem (blockchain, smart contracts, tokenomics and DeFi), which are essential to understanding how capital is generated, raised and managed in innovative ways. By the end of the course, students know and understand:

- i. the main actors of the fintech ecosystem (banks, regulatory authorities, new players);
- ii. the applications of digital technology to entrepreneurial finance (crowdfunding, token offerings) and the role of traditional actors (venture capital, business angels, accelerators);
- iii. the logic of start-up funding rounds and the functioning of both traditional and digital actors in entrepreneurial finance;

Applying knowledge and understanding

By the end of the course, students are able to:

use specific databases containing economic and financial information on technology-intensive start-ups;
analyse specific entrepreneurial cases by applying valuation and benchmarking methods;
apply elements of entrepreneurial finance, computer science (distributed systems, distributed consensus) and monetary theory to the bitcoin market and the associated blockchain technology.

Transversal skills

Making judgements: through the analysis of business cases, students develop critical skills regarding the life cycle of technology-intensive firms and the relationship between technology and sustainability.

Communication skills: students individually present their analyses in class, refining their ability to communicate economic, financial and technical concepts effectively to a specialist audience. The presentation will be delivered in English.

Learning skills: by the end of the course, students are able to independently use the main economic and financial databases for the analysis of technology-intensive companies and start-ups, thus being able to continue their

studies autonomously.

Contents

The course explores the widespread digital innovation in the financial sector and, in particular, the development of Fintech companies and Blockchain assets. Students will develop an in-depth view of Fintech market participants, regulation, and how new digital innovation has enlarged payment, investment, and financing opportunities for companies and individuals.

The first part of the course allows students to understand (1) the Fintech landscape and how fintech has changed the relationship with traditional banking services; (2) the applications of digital technology such as crowdfunding and token offerings along with the traditional subjects (venture capital, business angels, accelerators, ...) in the entrepreneurial finance domain.

The second part of the course is focused on bitcoin and the associated blockchain technology.

Starting from a computationally focused approach to elliptic curves over finite fields and presenting the discrete logarithm problem as the cornerstone of public-key cryptography, bitcoin is introduced as an ingenious breakthrough innovation. Its computer science (distributed systems, distributed consensus), and monetary theory elements are examined in the attempt to properly convey the interdisciplinarity of the topic and appreciate its relevance.

Detailed program

- Fintech: startups, banks, regulators and incumbent
- Payment world: new actors and new technology
- Crypto currency ecosystem
- Enabling technologies of digital currency
- Start-up financing cycle
- Seed finance: accelerator, business angels and incubators for supporting innovation
- Venture capital and Private equity
- Digital financial platforms: crowdfunding
- Token offerings: ICOs and STOs

Prerequisites

There are no strict prerequisites, even if some familiarity with algebra and finance might help to appreciate the course. While a rigorous formal approach is almost impossible in a course touching on so many and so different knowledge areas, intellectual curiosity is stimulated about the interplay between maths, cryptography, economic incentives, technology, monetary theory, regulatory issues, and politics.

Teaching methods

The course is composed of lectures, working group and online materials:

- 24 hours online materials available on the course page (video, reading, database)

- 6 hours of in presence lectures

Assessment methods

During the course period, the assessment of learning takes place in stages:

- Project work (40% of the grade)
- End-of-course test structured with multiple choice and 2 open questions (60%)

During the official exams, the assessment of learning is carried out through a written exam:

17 multiple-choice questions + 2 open-ended questions

Grading scale: –0-17 points multiple choice questions –0-10 first open-ended question (2 with no answer); –0-5 second open-ended question (2 with no answer)

Textbooks and Reading Materials

Suggested reading

Entrepreneurial Finance: The Art and Science of Growing Ventures Luisa Alemany, Job J. Andreoli, Cambridge University Press

Ferdinando Ametrano, "Bitcoin: oro digitale, finanza e tulipani",

https://docs.google.com/document/d/1gecm0uT43tI8d4WFYNs9H_v3p70PPfPmQITR4GxSWkE

Technology references

Satoshi Nakamoto,

"Bitcoin: A Peer-to-Peer Electronic Cash System" (2008),

<https://bitcoin.org/bitcoin.pdf>

A. Narayanan, et al.,

"Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction" (2016),

Princeton University Press, 978-0691171692,

<https://www.coursera.org/learn/cryptocurrency>,

<https://bitcoinbook.cs.princeton.edu>,

<https://bitcoinbook.cs.princeton.edu>, https://www.lopp.net/pdf/princeton_bitcoin_book.pdf

Pedro Franco,

"Understanding Bitcoin: Cryptography, Engineering and Economics" (2014),

Wiley, 978-1119019169

Ferdinando Ametrano,

"Bitcoin, Blockchain, and Distributed Ledgers: Between Hype and Reality" (2017),

<https://ssrn.com/abstract=2832249>

Monetary theory references

Friedrich A. Hayek,

"Denationalisation of Money: The Argument Refined",

<https://mises.org/library/denationalisation-money-argument-refined>

Ferdinando Ametrano,

"Hayek Money: The Cryptocurrency Price Stability Solution" (2014),

<https://ssrn.com/abstract=2425270>

Ferdinando Ametrano,

"Bitcoin: oro digitale per nuovi standard monetari (2020),

published in "Dal sesterzio al bitcoin", Rubettino Editore (edited by Angelo Miglietta, and Alberto Mingardi)

<https://drive.google.com/file/d/1-1k3wL6ElZzJMjSakTjTNetJI5ws6wL>

Semester

I Semester

Teaching language

English

Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE
