UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Digital Innovation and Finance

2425-3-E1803M125

Learning objectives

The student will be able to:
i. understand the main actors of the fintech ecosystem (bans, regulators, new incumbents)
ii. develop an in-depth view of 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.
iii. describe the operations of traditional e digital entrepreneurial finance subjects through the analysis of start-up financing rounds
iv. apply Game theory, computer science (distributed systems, distributed consensus), and monetary theory elements on bitcoin market and the associated blockchain technology.

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 game theory, 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.

Technical and programming elements about digital signatures, blockchain, Merkle tree, addresses, transactions, and timestamping are also provided to assess features and limits of the Bitcoin protocol.

Detailed program

- Fintech: startups, banks, regulators and incumbent
- Payment world: new actors and new technology
- Crypto currency ecosystem
- Enabling technlogies of digital currency
- Start-up financing cycle
- Seed finance: accelerator, business angels and incubators for supporting innovation
- Venture capital and Private equity
- Digital financa 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:

- 12 hours online materials available on the course page (video, reading, database)
- 30 hours of lectures

Assessment methods

During the course period, the assessment of learning takes place in stages:
-Carrying out and delivering case studies proposed during the lessons and at home (group work 4)
-End-of-course test structured with multiple choice and 4 open questions

The final evaluation will be composed as follows:
30% vote on cases carried out
70% final test

During the official exams, the assessment of learning is carried out through a written exam:
30 multiple-choice questions + 4 open-ended questions
Grading scale: –0-3 points multiple choice questions –15-30 open-ended questions (12 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/1gecm0uT43tl8d4WFYNs9H_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/1-1k3wlL6ElZzJMjSakTjTNetJI5ws6wL

Semester

II Semester

Teaching language

English

Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE