Blockchains and Cryptocurrencies

ECTS : 3

Description du contenu de l'enseignement :

Although blockchain technology is a fairly recent concept, the rate of innovation in this space has been tremendous over the past years. This class will give students an overview of the fundamental concepts needed to properly understand most aspects around blockchains, with a focus on the Bitcoin and Ethereum blockchains. We will also cover the most recent advanced topics including : Consensus Algorithms (Proof-of-Work vs Proof-of-Stake), the scaling problem, Smart contracts as well as a detailed approach of Decentralized Finance (DeFi), Token economics (Fungible and Non-Fungible Tokens) and CDBC. The academic literature is also very dynamic and this class will heavily rely on this literature to explain in depth the main concepts. Although an academic approach will help students get a solid knowledge about blockchains, this class will also incorporate some practical training, including low-level bitcoin transaction scripting and smart contract development/deployment/interaction with Solidity. Even if this class is not directed to computer scientists, students will be expected to make the effort to learn about the most important computer science primitives needed to understand the economics of blockchain. Such primitives will be taught in class.

Compétence à acquérir :

Students are expected to get an in-depth understanding of the functioning of any blockchain and DeFi projects, as well as an awareness of most of the current important issues and recent developments. Students will also be exposed to the most important papers in the literature as well as some knowledge on practical aspects like the basics of smart contract development. Students are not expected to become smart contract developers but rather to know the basics of it, how it works and ultimately to be able to interact with actual smart contract developers.

Mode de contrôle des connaissances :

Oral presentation (critical assessment of a chosen blockchain or DeFi project), Homework (coding, paper review) and/or final exam.

Bibliographie, lectures recommandées :

Books :

- Andreas Antonopoulos, Mastering Bitcoin, 2nd edition, O'Reily, 2017
- Andreas Antonopoulos, Gavin Wood, Mastering Ethereum, 1st edition, 2018
- Primavera De Filippi, Aaron Wright, Blockchain and the Law : The Rule of Code, Harvard University Press, 2018
- Campbell Harvey, Ashwin Ramachandran, Joey Santoro, DeFi and the Future of Finance, 1st edition, Wiley, 2021

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