Introduction to Blockchain and Cryptocurrencies Syllabus

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| InstructorSGur HubermanJohn D. LicciardelloEmailgh16@gsb.columbia.edujdlicciardello@gmail.comOffice Location807 UrisOffice HoursTBD | Course OverviewThis course will introduce fundamental concepts and a high-level overview of the burgeoning blockchain and cryptocurrency space. The course will begin by providing a background in fundamental concepts in Computer Science such as in cryptography, distributed systems, and data structures. It will then move on to an in-depth overview of blockchain, the history of Bitcoin and the proliferation of new consensus models, ICOs, smart contracts, and more. Industry guest speakers will share their perspectives.No prior knowledge will be required to take this course.Course MaterialsWeekly readings will be provided on Canvas. |

# Course Schedule

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| Week | Subject |
| Week 1 | Intro to Computer Science Topics – Cryptography, Distributed Systems, and Data Structures |
| Week 2 | Intro to Money, Bitcoin and Blockchain  |
| Week 3 | History of Bitcoin Hard Forks and New Consensus Models  |
| Week 4 | Smart Contracts, ICOs, and Potential Use-Cases |
| Week 5 | IOTA Case Study |
| Week 6 | In Class Presentations |

# Grading

The course grade will be based on a final project where students will be required to make a 15-minute presentation on a crypto-project of their choosing to the class in the final week. Teams of four will be randomly assigned. The presentation should include a high-level overview of the project, background on the team, the underlying technology and the use case the project hopes to address.

# Course Outline (tentative)

**Week 1 – Intro to Computer Science Topics – Cryptography, Distributed Systems, and Data Structures**

This session will give a quick overview of a few fundamental concepts in Computer Science necessary to understand Blockchain. These will include public key cryptography, distributed systems, fundamental data structures and related concepts.

**Week 2 – Intro to Money, Bitcoin and Blockchain**

Drawing on the Computer Science concepts introduced in the previous week, this session will be a deep dive into the Blockchain described in the seminal Bitcoin white paper written by the pseudonymous online identity of Satoshi Nakamoto. This session will also discuss the origins and purpose of money and compare and contrast Bitcoin as a money compared to other types of monies.

**Week 3 – History of Bitcoin, Hard Forks and New Consensus Models**

With our understanding of ‘Nakamoto Consensus’ from week 2, in this session we will discuss what happens when this consensus fails – the so-called ‘Hard Fork’. We will use the Bitcoin Cash hard fork which took place on August 1st, 2017 as a basis for our discussion. This session will also include a discussion of the history of Bitcoin, the development of the blockchain space in the ten years since the original Bitcoin white paper was published, and new consensus models which have emerged.

**Week 4 – Smart Contracts, ICOs, and Potential Use-Cases**

In this week, we will discuss extensions of the Blockchain design introduced by Bitcoin to discuss Smart Contracts pioneered by Ethereum, the explosion of so-called Initial Coin Offerings “ICOs” in 2017, and other potential use-cases of Blockchain for applications in supply chains, real estate, finance and more.

**Week 5 – IOTA Case Study**

This session will be a discussion of a relatively new project in the space which has enjoyed much success and faces various challenges. A case study describing a particular decision point which needs to be addressed by the project’s leaders will be discussed.

**Week 6 – In Class Presentations**

Students will give presentations to the class in this session.