

Cryptocurrency, Blockchain, and Their Business Applications

Course Code: ACCT 5801

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COURSE DESCRIPTION

This course discusses cryptocurrencies (including Bitcoin, Ethereum, and others), blockchain, also known as distributed ledger technology (DLT), and their multidimensional business applications. The course provides a basic set of skills to understand cryptocurrencies and blockchain/DLT. We will also discuss the latest development in the field.

COURSE MATERIAL

This course has no required textbooks. The following are some suggested reading/watching materials.

Key Materials:

- [Bitcoin: A Peer-to-Peer Electronic Cash System](#) (Satoshi Nakamoto, 2009)
- [The idea of smart contracts](#) (Nick Szabo)

Introductory Materials and Short Videos:

- [Explain Bitcoin Like I'm Five](#) (Non-technical)
- [Blockchain explained](#) (Non-technical) [6 minutes]
- [The Essence of How Bitcoin Works](#) (Non-technical) [5 minutes]
- [Introduction to Bitcoin](#) (Non-technical) [37 minutes]
- [How Bitcoin Works Under the Hood](#) (Somewhat technical) [22 minutes]
- [How Bitcoin Works in 5 Minutes](#) (Technical) [5 minutes]
- [Ever wonder how Bitcoin \(and other cryptocurrencies\) actually work?](#) (Technical) [26 minutes]
- [Digital Currency Tutorials](#) (Coindesk Q&A)

On-Line Course:

- [Bitcoin and Cryptocurrency Technologies](#) (Coursera, done by Arvind Narayanan and follows the recommended book below. Advanced)

Recommended Books:

- [The Age of Cryptocurrency: How Bitcoin and Digital Money Are Challenging the Global Economic Order](#) (by *Wall Street Journal* writers Paul Vigna and Michael J. Casey, explains cryptocurrency)
- [Bitcoin and Cryptocurrency Technologies](#). Princeton University Press (by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder.) [Book based on a [Coursera](#) by the same name run by Arvind Narayanan. Lectures also on [YouTube](#).] A full pre-publication draft can be downloaded at no cost at the following link:
https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf
- [Mastering Bitcoin](#). (by Andreas M. Antonopoulos)

The author offers a free English version here: <https://github.com/bitcoinbook/bitcoinbook>
Other languages but older versions are available here: <https://bitcoinbook.info/translations-of-mastering-bitcoin/>

- [Cryptoassets. The Innovative Investor's Guide to Bitcoin and Beyond.](#) (by Chris Bruniske and Jack Tatar.)
- [The Truth Machine: The Blockchain and the Future of Everything.](#) (by *Wall Street Journal* writers Paul Vigna and Michael J. Casey, focus on blockchain use cases)

COURSE OUTLINE

Topic 1: Blockchain and Cryptocurrency Overview

- What is cryptocurrency and Blockchain?
- History of cryptocurrency
- How is it different from fiat currency?
- Current state of the field

Suggested Reading:
Narayanan et al., Preface

Additional Reading:
Bruniske and Tatar, Ch. 1-3
[Untraceable Electronic Cash \(Chaum, Fiat and Naor 1990\)](#)

Topic 2: Blockchain Fundamentals

- Blockchain overview
- Basics of cryptography in the blockchain
- Decentralized digital identity
- Transactions
- Block building and consensus mechanism
- Coding with Solidity on Ethereum Blockchain

Suggested Reading:
Narayanan et al., Ch. 1-3, 5

Topic 3: Enterprise Applications of Blockchain

- Pros and Cons of using blockchain
- Blockchain applications in various sectors
- Notable blockchain consortiums
- Business decisions about blockchain

Topic 4: Smart Contracts

- What is a smart contract?
- Advantage of smart contracts
- Applications of smart contracts
- A smart contract example: Lightning network
- Other use cases and characteristics

Suggested Reading:
Narayanan et al., Ch. 9
[Lightning network \(Summary, white paper\)](#)

Additional Materials:

Lightning network status: <https://1ml.com/>

Latest prediction market on Augur: <https://predictions.global/?s=Money%20at%20Stake>

Topic 5: Blockchain Programming

Preparation for Programming Exercises:

Please install Python 3 before class. Recommended distribution of python:

<https://www.anaconda.com/distribution/>

Suggested Reading to jump-start solidity programming:

Solidity and object oriented programming (OOP)

<https://medium.com/coinmonks/solidity-and-object-oriented-programming-oop-191f8deb8316>

Getting Deep Into Ethereum: How Data Is Stored In Ethereum?

<https://hackernoon.com/getting-deep-into-ethereum-how-data-is-stored-in-ethereum-e3f669d96033>

Topic 6: Valuation of Cryptocurrency

- Basic valuation approach
- Crypto valuations

Links to data sources:

Bitcoin marketcap: <https://www.blockchain.com/charts/market-cap>

Bitcoin transactional value: <https://www.blockchain.com/charts/estimated-transaction-volume-usd>

More cryptocurrency data: <https://coinmetrics.io/data-downloads/>

Additional tools: <https://coinmetrics.io/>

Additional Reading:

Bruniske and Tatar, Ch. 6-13

Individual assignment: Bitcoin Case

Due before next class (Both the case materials and questions will be posted on Canvas)

Topic 7: Practical Use of Cryptocurrency

- The cryptocurrency ecosystem
- Cryptocurrency and anonymity
- Cryptocurrency wallets
- Investment in altcoins and mining
- Tax and inheritance

Suggested Reading:

Narayanan et al., Ch. 4, 6

Additional Reading:

Bruniske and Tatar, Ch. 4, 14-15

Additional Topic: Token Offering (only cover if time permits)

- What is an Initial Coin Offering?
- Advantage and Disadvantage of ICO
- ICO Regulation
- Securities Token Offering – Regulated ICOs
- Trends in Token Offering
- Tokenomics

Suggested Reading:

Narayanan et al., Ch. 7

[SEC Release No. 81207 \(The DAO\)](#)

Additional Reading:

Bruniske and Tatar, Ch. 16