

# 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 referred to as distributed ledger technology (DLT), and their application in business sectors. The course first explains the history of cryptocurrency, and the fundamentals of blockchain including cryptography and consensus mechanism. Although technical, this part is essential to establish a foundation to understand cryptocurrencies and blockchain. We will then cover some real-world applications of blockchain technology, including enterprise blockchain, smart contracts, and token offerings, e.g., initial coin offerings (ICOs), securities token offering (STOs). Finally, the course will cover the valuation models for cryptoassets, the practical details of how to use cryptocurrency, and various investment related to blockchain. The goal of the course is to provide students with a basic set of skills to understand cryptocurrencies and blockchain and how businesses can use them.

## **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](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