

# Blockchain and its application to finance

Module 3, 2018-2019

Great Colleagues and Oleg Shibarov

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## Course description

The core of this course is blockchain, its usage and applications. Students will study both technical side of blockchain and most important components of its current development. Bitcoin and ICO will also be covered. The course does not require preliminary work, yet one will have to work on blockchain and project valuation.

## Course requirements, grading, and attendance policies

Statistics, econometrics, financial markets.

The course grade is based on two home assignments (40%) and final exam (60%).

## Course contents

Week	Date	Topic	Reading
1		<b>Introduction to cryptography (Sergey Prilutskiy, MixBytes)</b> 1. Symmetric cryptography 2. Asymmetric cryptography	[1]
2		<b>Blockchain and consensus (Sergey Prilutskiy, MixBytes)</b> 1. Decentralized networks 2. Bitcoin and blockchain architecture 3. Consensus algorithms, security aspects, modern protocols	[2], [3]
3		<b>Smart contracts and multiparty computations (Sergey Prilutskiy, MixBytes)</b> 1. Ethereum blockchain structure 2. Smart contracts, security, problems and solutions, production cycle 3. Example cases, tokens, automated deals 4. Practical aspects and related software	[4]
4		<b>Business models</b> 1. Public (ex. Ethereum) vs. private solutions (ex. Hyperledger) 2. Exchanges, fiat to crypto, etc. – Binance vs OKex, few types of the exchanges on CMC 3. Financial transactions and products – Ripple, OmiseGo, Celo, Nexo 4. Logistics and IoT: tracking and verifying products – VeChain, WaltonChain, tracking for financial solutions – Eximchain 5. KYC and voting: how blockchain could transfer the consensus within the society	[7]

5	<b>Business models (cont.)</b> 1. Betting and gambling with blockchain – Augur 2. Smart contracts beyond the Ethereum – Waves, Aeternity, Tron, Zilliqa Funds and investment in crypto – ICO, PoS, trading currencies 1. Investment approach to cryptocurrencies 2. Funds, how they choose projects, and inflows/outflows 3. The results of 2017 and 2018 – Pantera, Signum Capital, DHWC and other funds 4. Current investment opportunities 5. P.S. how it was – ICO hype 2017-2018	[7]
6	<b>Funds and investment in crypto (Maxim Ulyanov)</b> 1. Investment approach to cryptocurrencies 2. Mining 3. Funds, how they choose projects, and inflows/outflows	[6]
7	<b>(if time permits) Optimal portfolio choice with crypto assets (Oleg Shibarov)</b> 1. Diversification 2. Returns 3. Bitcoin as a new gold?	[5]

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### Course materials

1. “Bitcoin and Cryptocurrency Technologies”, Chapter 1  
([https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton\\_bitcoin\\_book.pdf](https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf))
2. “Bitcoin and Cryptocurrency Technologies”, Chapter 2
3. “Bitcoin and Cryptocurrency Technologies”, Chapter 3
4. “Bitcoin and Cryptocurrency Technologies”, Chapter 4
5. “Bitcoin and Cryptocurrency Technologies”, Chapter 5
6. “Bitcoin and Cryptocurrency Technologies”, Chapter 6
7. «Do you need a Blockchain?» <https://eprint.iacr.org/2017/375.pdf>

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### Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.