UPCES
Undergraduate Program in
Central European Studies

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Center for Economic Research and Graduate Education

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Digital Currencies and Cryptocurrencies

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Course Description:

This course will consider the new phenomenon of digital currencies from a monetary and financial stability angle. We will first look at functions of money and history of private and public money. We will continue with technological foundations of cryptocurrencies and we will discuss existing and potential use of blockchain in finance. Consequently, we will cover stablecoins, discuss the differences via-a-vis cryptocurrencies and discuss why they have the potential to change the global financial system. We will discuss private efforts to issue stablecoins (e.g. Libra/Diem) and discuss why they raise concerns of regulators. Finally, we will introduce central bank digital currencies, discuss challenges and risks related to their issuance as well as reasons why central banks around the world experiment with them. We will study central bank digital currencies that exist so far and we will learn about their potential impact on payment systems, financial stability and monetary policy.

Course Objectives/Learning Outcomes:

Upon completing the course, students will gain the following abilities:

- Grasp the technological intricacies of blockchain-based digital currencies, including understanding hashes, currency issuance and mining processes, proof-of-work and proof-of-stake concepts, as well as consensus and distributed ledger technology.
- Recognize both the similarities and disparities between cryptocurrencies and established monetary and banking systems.
- Comprehend potential regulatory frameworks for cryptocurrencies and stablecoins, along with the challenges posed by the current regulatory environment.
- Articulate the economic rationale behind the utilization of Central Bank Digital Currencies (CBDCs) in contrast to other payment instruments.
- Apply the provided framework to analyze and contemplate the design and implementation of CBDCs.
- Evaluate the advantages and drawbacks of CBDCs using the principles introduced in the course.
- Identify potential threats to financial stability and analyze various risks through country-specific case studies.

Course Requirements: None

Grading Policy:

Grades are based on the following components:

(1) Homeworks, presentations and other assignments	50%
(2) Midterm exam	25%
(3) Final exam	25%

Mandatory Completion Policy

Note that all mandatory assignments and exams must be completed to the best of your ability in order for your final grade to be issued. Failure to complete a mandatory assignment or exam may result in a failing grade.

Letter Grade	Percentage	Description
A	93-100	Outstanding work
A-	90-92	
B+	87-89	Good work
B	83-86	
B-	80-82	
C+	77-79	Acceptable Work
C	73-76	
C-	70-72	
D+	67-69	Work that is significantly below average
D	63-66	
D-	60-62	
F	0-59	Work that does not meet the minimum standards for passing the course

UPCES Academic Integrity Policy
Plagiarism and other forms of academic dishonesty are not tolerated. The use of Artificial Intelligence (AI) for the development of knowledge and learning is encouraged at many stages of the learning process. While we value technology for educational purposes, we also value originality and the retainment of knowledge, and thus using AI for assignments and examinations, even if rephrased, is strictly prohibited and considered an academic integrity violation, unless the instructor explicitly allows for it in the context of evaluated work

UPCES Non-Discrimination/Harassment Policy
The UPCES program in Prague promotes a diverse learning environment where the dignity, worth, and differences of each individual are valued and respected. Discrimination and harassment, whether based on a person's race, gender, sexual orientation, color, religion, national origin, age, disability, or other legally protected characteristic, are repugnant and completely inconsistent with our objectives. Retaliation against individuals for raising good faith claims of harassment and/or discrimination is prohibited.

UPCES Diversity Policy
UPCES fully embraces diversity and strives to create a safe and welcoming environment for students from all backgrounds. Prague is a wonderfully diverse community and UPCES is no different. All students should feel at home while studying abroad and UPCES will do its utmost to make sure that becomes a reality. Although unique challenges may arise, we believe that students from all walks of life will encounter wonderful opportunities for enrichment as they explore a new culture while studying abroad.

The course will consist of the following topics:

- Changes in money and payments (2 weeks)

  - Functions of money
  - History of money, how did we end up with central banks issuing public money
  - Revolution in money: Real time settlements, credit card schemes, declining use of cash

- Cryptocurrencies and blockchain (3 weeks):

  - Hashes, public and private keys, signatures
  - What is blockchain and how it works, the process of currency issuance and mining, public and private keys, transactions
  - Examples of existing and possible use of blockchain in finance

- Bitcoin (1 week):

  - History of the Bitcoin as the most popular cryptocurrency
  - Limits of bitcoin, energy consumption needed for bitcoin transactions

- Stablecoins (1 week):

  - What is the idea behind stablecoins, how do they differ from cryptocurrencies
  - Project of Libra/Diem, its history and potential future
  - How can stablecoins change the financial system worldwide and why regulators care

- Central Bank Digital Currencies (CBDC, 4 weeks):

  - How does CBDC differ from cash
  - Potential forms of CBDC: Token based/account based, interest bearing or not, anonymity, limits&caps
  - Examples of existing CBDC projects in the world, Bank for International Settlements CBDC initiatives
  - Opportunities: Faster and cheaper payments, especially if implemented internationally, Inclusion of unbanked
  - Concerns: Why CBDC can be a threat to financial stability? Anti-money laundering, decline of liquidity
  - Possible effects of CBDC on monetary policy

Readings:

McLeay, Michael and Radia, Amar and Thomas, Ryland, Money Creation in the Modern Economy (March 14, 2014). Bank of England Quarterly Bulletin 2014 Q1, Available at SSRN: https://ssrn.com/abstract=2416234

Nofer, M., Gomber, P., Hinz, O. et al. Blockchain. Bus Inf Syst Eng 59, 183–187 (2017). https://doi.org/10.1007/s12599-017-0467-3

A Peer-to-Peer Electronic Cash System, Bitcoin whitepaper, https://bitcoin.org/bitcoin.pdf

Linda Schilling, Harald Uhlig, Some simple bitcoin economics, Journal of Monetary Economics, Volume 106, 2019, Pages 16-26, ISSN 0304-3932, https://doi.org/10.1016/j.jmoneco.2019.07.002.

Harald Vranken, Sustainability of bitcoin and blockchains, Current Opinion in Environmental Sustainability, Volume 28, 2017, Pages 1-9, https://www.sciencedirect.com/science/article/pii/S1877343517300015

Bullmann, Dirk and Klemm, Jonas and Pinna, Andrea, In Search for Stability in Crypto-Assets: Are Stablecoins the Solution? (August, 2019). ECB Occasional Paper No. 230 https://ssrn.com/abstract=3444847

CBDCs: an opportunity for the monetary system, BIS Annual Economic Report 2021 https://www.bis.org/publ/arpdf/ar2021e3.htm

Bordo, Michael and Levin, Andrew, (2017), Central Bank Digital Currency and the Future of Monetary Policy, No 23711, NBER Working Papers, National Bureau of Economic Research, Inc, https://EconPapers.repec.org/RePEc:nbr:nberwo:23711.

A stocktake on the digital euro, 2023, European Central Bank https://www.ecb.europa.eu/paym/digital_euro/investigation/profuse/shared/files/dedocs/ecb.dedocs231018.en.pdf

Behind the Scenes of Central Bank Digital Currency: Emerging Trends, Insights, and Policy Lessons, IMF FinTech Notes - Note/2022/004 https://www.elibrary.imf.org/view/journals/063/2022/004/063.2022.issue-004-en.xml

Money and Payments: The U.S.Dollar in the Age of Digital Transformation, 2022, BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf

An accessible and secure retail CBDC ecosystem, BIS, 2023 https://www.bis.org/publ/othp74.htm

The digital pound: Technology Working Paper, Bank of England, 2023

https://www.bankofengland.co.uk/paper/2023/the-digital-pound-technology-working-paper

The digital pound: a new form of money for households and businesses? Bank of England Consultation Paper, 2023
https://www.bankofengland.co.uk/paper/2023/the-digital-pound-consultation-paper