



University
of Basel

Center for
Innovative Finance



Bitcoin, Blockchain and Cryptoassets

Intro: Welcome to the Course

Prof. Dr. Fabian Schär
University of Basel

Release Ver.: (Local Release)
Version Hash: (None)
Version Date: (None)

License: Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International



Course Structure 1

1. Introductory Part:

- Introduction to the Class
- Foundations of Monetary Theory
- Payment Systems
- Monetary Control Structures
- Bitcoin Primer

2. Transaction Capacity:

- Peer-to-Peer Networks
- The Bitcoin Network

3. Introduction to Cryptography:

- Hash Functions
- Symmetric Cryptography
- Asymmetric Cryptography
- Elliptic Curve Cryptography
- FAQ: Attack Vectors

Course Structure 2

4. Transaction Legitimacy:

- Transactions
- Bitcoin Script and Standard Transactions
- Example Transaction
- Sig Hash Types

5. Transaction Consensus:

- Block Assembly
- Chain Structure
- Introduction to Consensus
- Consensus Protocols Overview
- Proof-of-Authority
- Proof-of-Work
- Fork Theory
- Incentives and Potential Attacks

Course Structure 3

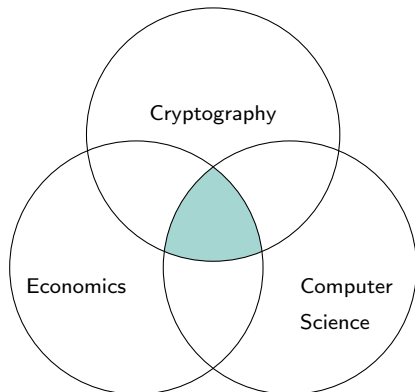
6. Bitcoin as Money:

- History of Digital Money
- Valuation Models
- Volatility
- CBDC and Stablecoins
- Risks and Illicit Activity

7. Advanced Topics:

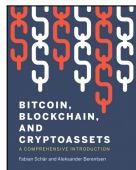
- Bitcoin Applications
- Economic Scripting
- Scalability
- Payment Channels and LN
- Transaction Malleability and SegWit
- Teaser: Next Steps

Interdisciplinary Approach



Bitcoin and public Blockchains can only be fully understood, when they are studied from various perspectives. This is the reason why this class uses an **interdisciplinary** approach.

Recommended Literature



Bitcoin, Blockchain and Cryptoassets

Fabian Schär and Aleksander Berentsen

ISBN: 978-0262539166



Mastering Bitcoin - Second Edition

Andreas Antonopoulos

ISBN: 978-1491954386



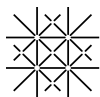
Programming Bitcoin

Jimmy Song

ISBN: 978-1492031499

Part of Multi-Course Series

Blockchain courses have been part of the University of Basel's curriculum since 2017.



**University
of Basel**

Center for
Innovative Finance

- This is a University undergrad-/bachelor-level course
- It is part of a series of courses
- First course to switch to open lecture format

→ There will be more open lecture courses.

Three Options to Take This Course

The goal of our open lectures is to make teaching resources freely available. There are **three options** for taking this course:

	Videos	Platform	Assignments	ECTS
YouTube	✓			
Cryptolectures.io	✓	✓	✓	
University of Basel	✓	✓	✓	✓

[🔗 YouTube Channel](#)

[🔗 Cryptolectures.io](#)

[🔗 University of Basel - General Information](#)

Information for University of Basel Students

Exam:

- 90 Minutes
- Closed book
- T/F, MC, Numbers and Text/Figure Boxes
- You may use a non-programmable calculator (↗ Rules)

Mid-Semester Problem Set:

- Problem set will be published mid-semester
- Extra credit if you hand-in correct solutions before deadline.

Meet the Open Crypto Lectures Team

Professor

Fabian Schär



PhD Candidates

Dario Thürkauf



Student Assistants

Patrik Hänggi



Former Team Members

Andreas Arnold, Tobias Bitterli, Lorenz Geering, Mitchell Goldberg,
Matthias Nadler, Pirmin Özdemir, Matthieu Piccand, Jakob Roth,
Jonas Ruchti, Katrin Schuler