



## Course and Examination Fact Sheet: Spring Semester 2023

### 8,288: Blockchain Markets

ECTS credits: 4

#### Overview examination/s

(binding regulations see below)

Central - Written examination (100%, 90 mins.)

Examination time: inter-term break

#### Attached courses

Timetable -- Language -- Lecturer

[8,288,1.00 Blockchain Markets](#) -- Englisch -- [Häfner Samuel](#)

#### Course information

#### Course prerequisites

There are no formal requirements. However, students should have a sound knowledge of basic microeconomic tools and be acquainted with game-theoretic reasoning. Furthermore, students should be willing to engage in abstract mathematical modelling and read research articles. No previous knowledge of blockchain technology is required.

#### Learning objectives

This course gives an introduction to blockchains and the current microeconomic research on the topic. Specifically, students will learn: (1) the technical components of blockchain markets, (2) the key stakeholders in blockchain ecosystems and their incentives, and (3) the regulatory aspects and other challenges of the technology from an economic perspective.

#### Course content

The course comes in three major parts.

Part I: Market Forms -- In this part, we first examine the history of blockchain technology and how the industry has evolved over the last few years. Then, we analyze key blockchain markets in more detail: payment systems (with a focus on Bitcoin), smart-contract chains (with a focus on Ethereum), stablecoins, and central bank digital currencies.

Part II: Security --- In this part, we look at blockchain technology's security guarantees. We start with the classical consensus problem and then study how current blockchain networks provide the necessary incentives to overcome it. Topics include Byzantine fault tolerance, Nakamoto consensus, proof-of-work, proof-of-stake, and oracles.

Part III: Regulatory Topics --- This part looks at various regulatory issues of blockchain technology. These include decentralization and antitrust, initial coin offerings, and tokenization.

Importantly, while the course does provide a technical overview of blockchains at a relevant level of detail, its main perspective on the technology is economical. Specifically, the focus lies on a fast-growing microeconomic literature that covers various aspects of blockchain markets. In addition, we will also look at a relatively novel game-theoretic literature that takes a strategic perspective on consensus mechanisms.

#### Course structure and indications of the learning and teaching design

There will be weekly lectures. Some will involve presentations by external experts.

#### Course literature

The relevant literature will be made available on Canvas.



Unfortunately, there is no single textbook that covers all topics of the course. I will draw from various sources, including the following textbooks:

Halaburda, H., M. Sarvary, and G. Haeringer (2022): *Beyond Bitcoin: Economics of Digital Currencies and Blockchain Technologies*, Palgrave MacMillan.

Narayanan, A., J. Bonneau, E. Felten, A. Miller, and S. Goldfeder (2016): *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction*, Princeton University Press.

Schär, F. and A. Berentsen (2020): *Bitcoin, Blockchain, and Cryptoassets: A Comprehensive Introduction*, MIT Press.

Shi, E. (2022): *Foundations of Distributed Consensus and Blockchains*, Lecture Notes.

In addition, we will read (recent) research papers, including:

Biais, B., C. Bisiere, M. Bouvard, and C. Casamatta (2019): "The Blockchain Folk Theorem," *The Review of Financial Studies*, 32, 1662-1715.

Catalini, C., A. de Gortari, and N. Shah (2021): "Some Simple Economics of Stablecoins," MIT Sloan Research Paper.

Diamond, D. W. and P. H. Dybvig (1983): "Bank Runs, Deposit Insurance, and Liquidity," *Journal of Political Economy*, 91, 401-419.

Huberman, G., J. D. Leshno, and C. Moallemi (2021): "Monopoly without a Monopolist: An Economic Analysis of the Bitcoin Payment System," *The Review of Economic Studies*, 88, 3011-3040.

Lee, M., A. Martin, and R. M. Townsend (2021): "Optimal Design of Tokenized Markets," Working Paper.

Leshno, J. D. and P. Strack (2020): "Bitcoin: An Axiomatic Approach and an Impossibility Theorem," *American Economic Review: Insights*, 2, 269-86.

## Additional course information

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## Examination information

### Examination sub part/s

#### 1. Examination sub part (1/1)

##### Examination time and form

Central - Written examination (100%, 90 mins.)

Examination time: inter-term break

##### Remark

BYOD-Exam on Campus

##### Examination-aid rule

Closed Book

The use of aids is prohibited as a matter of principle, with the exception of pocket calculator models of the Texas Instruments TI-30 series and, in case of non-language exams, bilingual dictionaries without any handwritten notes. Any other aids that are admissible must be explicitly listed by faculty members in the paragraph entitled "Supplementary aids" of the course and examination fact sheet; this list is exhaustive.



Procuring any aids, as well as ensuring their working order, is the exclusive responsibility of students.

## Supplementary aids

The examination will be conducted as a digital exam using the following aids:

- **private Notebook**(binding) - no tablets!
- **battery charging cable** (binding)
- external computer mouse (optional)
- external computer keyboard (optional)

We expressly point out that the exam cannot be taken with tablets/iPads.

For the exam you will need:

- Operating system Windows oder MacOS
- Software: Minimum Office 2016 or Office 365
- Special software:[LockDown Browser](#)
- HSG login incl. access modalities
- WLAN - functioning access to Eduroam

Please note that,

- Technical tests (mock exams without grades) will be conducted before the central exam. Participation is strongly recommended!
- All updates are up to date before the exam.
- Screen privacy filters are not permitted.
- You are responsible for the proper functioning of your device.

During the entire test, the use of additional equipment not listed above is strictly prohibited.

Any necessary actions with other software or additional devices require prior approval of the examination administration and are only permitted under supervision.

Any violation of these rules of conduct may be punished as a violation of the University's regulations.

## Nature of examination

digital

## Examination languages

Question language: English

Answer language: English

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## Examination content

- All material covered in class, i.e. any lecture slides, lecture notes, case studies.
- This includes in particular the following topics as described in the course content above: blockchain market forms (both their technological aspects as well as their economical aspects), blockchain security (both technological as well as game-theoretic aspects), and regulatory issues of blockchain technology.

## Examination relevant literature

- Lecture content (slides, lecture notes, case studies)
- Selected journals and textbook chapters as indicated and made available on Canvas (before the end of the lecture period).



## Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are binding and takes precedence over other information, such as information on StudyNet (Canvas), on lecturers' websites and information in lectures etc.

Any references and links to third-party content within the fact sheet are only of a supplementary, informative nature and lie outside the area of responsibility of the University of St.Gallen.

Documents and materials are only relevant for central examinations if they are available by the end of the lecture period (CW21) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 12 are relevant for testing.

Binding nature of the fact sheets:

- Course information as well as examination date (organised centrally/decentrally) and form of examination: from bidding start in CW 04 (Thursday, 26 January 2023);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 12 (Monday, 20 March 2023);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 12 (Monday, 20 March 2023);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the de-registration period in CW 15 (Monday, 10 April 2023).