



Course Organisation

Network Science '21: Session 0.1

Claudio J. Tessone

Blockchain and Distributed Ledger Technologies

UZH Blockchain Center



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Who are we?



Who are we?



**Prof. Dr Claudio J.
Tessone**



Dr Carlo Campajola



Yu Gao 高 雨

Blockchain & Distributed Ledger Technologies
<http://www.ifi.uzh.ch/en/bdlt>
UZH Blockchain Center
<http://www.blockchain.uzh.ch>



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Course details



Course details

- **Target Audience:** This course is acknowledged for MA students and is assigned to the Core elective areas „Wahlpflichtbereich“:
 - Information Systems (INF1), Data Science (INF5), Artificial Intelligence (INF6)
 - Marketing (BMC)
 - OEC elective area
- **Further information:**
 - <https://www.ifi.uzh.ch/en/bdlt/Teaching/Network-Science.html>
- **Syllabus**



Workload

6 ECTS, equivalent to a workload of ca. 180h

<i>Concept</i>				<i>Total (h)</i>
Preparation				20
Lectures	12	x	2	24
Self-study				20
Assignments	7	x	10	70
Final Project				40
	Total			174



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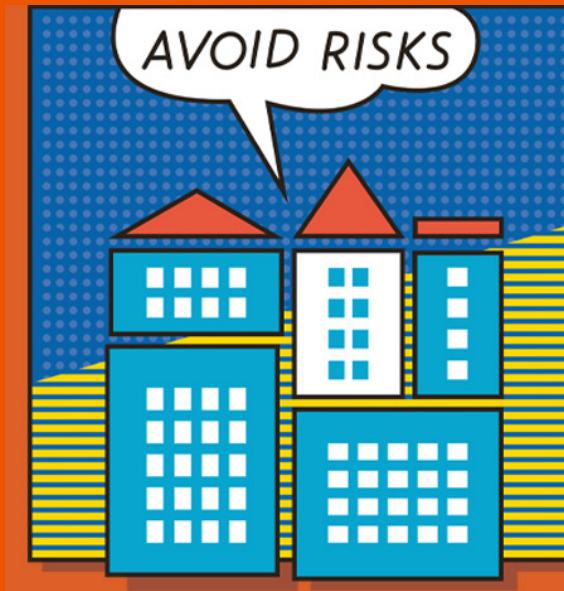
How will this course work



Autumn Term '21



recommended



COVID Certificate

Avoid attending if you
have symptoms



The functioning of the course may change depending on the situation of the pandemic



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How the course will begin



Lectures' structure

Regular lectures: ALL MONDAYS 10:15 to 13:45

- Theory Session (ca. 1:00 / 1:15 hours)
- Break
- Introduction to the assignments
- Hands-on session
- Q&A session

The lectures will be recorded and left on MS Teams

All slides will be made available by the time of the lecture



How to attend lectures?

1. *Onsite lectures*

Those with COVID Certificate should be attending the lectures on-site.
Lectures will take place in Binzmühlestrasse.

2. *Virtual participation*

For those without a COVID certificate can join the sessions in Zoom:

3. *Backup of lectures*

A digital backup of the theory of all lectures will be kept in MS Teams for your future consultation.



Lectures' Structure (ii)

Q&A Sessions

ALL WEDNESDAYS AND THURSDAYS from 14:00 to 15:30

They are non-mandatory

- They will take place as a Group Meeting on the General Channel of our Team on [MS Teams](#)



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Evaluation



Assignments: in-class + home-work



Grading (i): Assignments

40% of your grade

- ⊕ There is one assignment following each lecture
- ⊕ You have two weeks to submit the solutions
- ⊕ It can be done in groups of (maximum) 2 students
- ⊕ You must submit your answers. Answer means:
 - ⊖ Code
 - ⊖ *A document with the results clearly visible*
 - ⊖ *Possible formats are: PDF, Python Notebook, R Markdown*



Grading (i): Assignments

In your submissions, all code must be already executed and results visible.

Submitting code alone without the accompanying plots, numeric results displayed, and (when required) discussion will be considered as fail



Grading (i): Assignments

Correction

- Assignments will be corrected (Yu + Carlo) within two weeks after the submission deadline
- We will make available a sample solution after the submission deadline (in the same week)
- Each exercise will receive a mark in the range 0-6 (4: pass)

Comments

- ⊕ It is not a test: you can ask for support in the process ([MS Teams](#))
- ⊕ You can receive feedback all the time:
 - ⊖ By MS-Teams
 - ⊖ In the next Session
 - ⊖ Q&A



Final Project: Group work covering all the cycle of work on network science (explore a specific problem, reproduce a paper, etc.)



Grading (ii): Final Project

60% of your grade

- + You will work on a project that is inspired on the contents of the course
- + This is the final examination
- + Group work *but individual evaluation*
- + It can be done in groups of (maximum) 4 students
- + By the deadline you must submit
 - Written report
 - All code + Data used
 - Recorded video presentation (20 minutes) which will be made available to other students + Slides of the presentation



Grading (ii): Final Project – Written Report

- ✚ Length: 3000 – 4000 words / 6 – 8 pages)
 - ✚ Report template will be put in MS Teams
-
- ✚ The report must have an authorship statement at the end. An example is.

AUTHOR CONTRIBUTIONS

All authors conceived and designed the project idea. P.M. and C.J.T. performed the literature review and wrote the introduction. B.S. performed the data collection. Y.Z. and X.Y. analysed the data. B.S. wrote the bulk of the text. All authors discussed and reached the conclusions. All authors revised and accepted the final version of this document.



Projects can be suggested by you!

Pro-active suggestion of topics you find interesting in Network Science.

- ⊕ Write an abstract (one paragraph), justifying the interest
- ⊕ ***Needs to be approved by the module coordinator***

Otherwise, we will provide a list of possible topics



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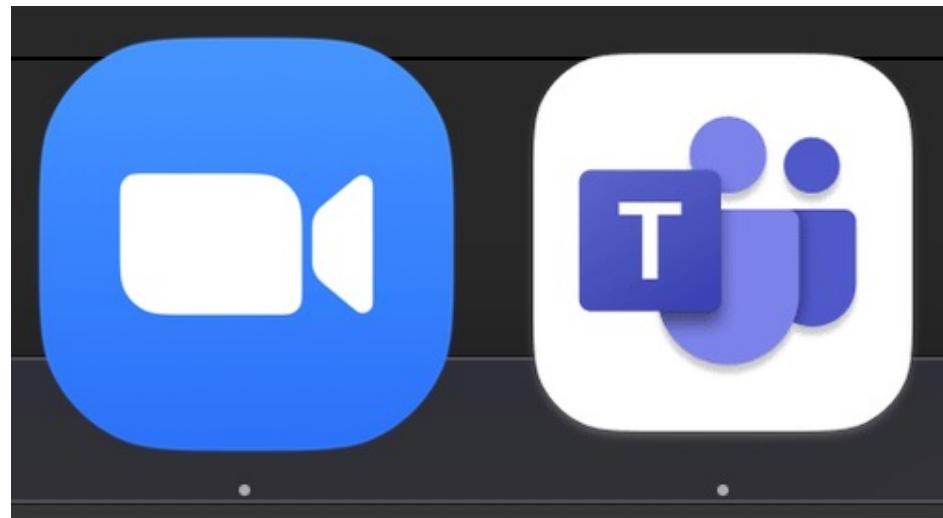
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Software tools



Software Tools



MS Teams for communication, document and lecture sharing

Zoom for lectures



MS Teams

The screenshot shows the Microsoft Teams application interface. On the left, the sidebar displays various team channels: All teams, BDLT NETWORK SCIENCE '21 (selected), Network Science (HS21), Class Notebook, Assignments, Grades, Insights, Channels (General selected), Management, and other options like Activity, Chat, Teams, Assignments, Calls, Files, Tasks by PL..., and Apps. The main area shows the 'General' channel of the BDLT team. A message from Claudio Tessone at 21:09 reads: 'Lectures Structure / Attendance'. Below the message, a section titled 'Monday sessions (from 10:15 to 13:45) will be hybrid.' is present. It details that those with COVID Certificate should attend onsite lectures in Room BIN-0-K.02, and provides a link (<https://www.plaene.uzh.ch/BIN>) and regulations (<https://www.uzh.ch/cmsssl/en/about/coronavirus.html>). Another section, '2. Virtual participation', provides a Zoom link (<https://uzh.zoom.us/j/63273833535?pwd=RzhDcDI6UTIBbmFzYmdFRHJKRWFQ09>), Meeting ID: 632 7383 3535, and Passcode: 641880. A note at the bottom encourages virtual participants to keep cameras on for visual feedback.

Lectures Structure / Attendance

Monday sessions (from 10:15 to 13:45) will be hybrid.

1. Onsite lectures

Those with COVID Certificate should be attending the lectures on-site. Lectures will take place in Binzmühlestrasse.

<https://www.plaene.uzh.ch/BIN>

Room: BIN-0-K.02

Please read the UZH regulations related to the requirements to attend onsite

<https://www.uzh.ch/cmsssl/en/about/coronavirus.html>

2. Virtual participation

For those without a COVID certificate can join the sessions in Zoom:

<https://uzh.zoom.us/j/63273833535?pwd=RzhDcDI6UTIBbmFzYmdFRHJKRWFQ09>

Meeting ID: 632 7383 3535

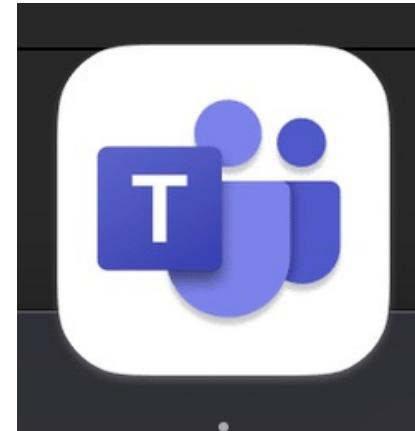
Passcode: 641880

For virtual participants, we would be grateful if you can keep your cameras on, as visual feedback with you is of help to us when lecturing. An instructor will continuously monitor questions or comments from non-onsite participants

New conversation



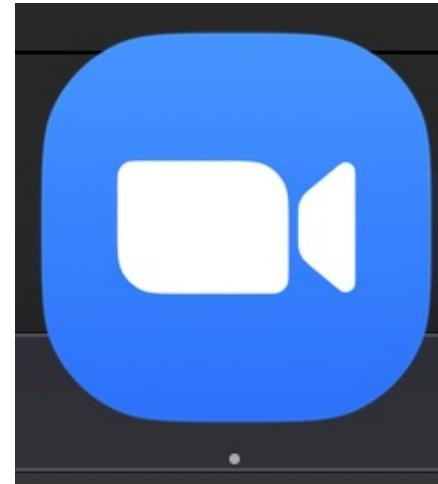
MS Teams



- Lectures in Files folder
- Assignments and Grades in the respective section
- General questions to be posted in the General Channel
- Bilateral questions, can be asked in the Chat channel
- Ad-hoc calls can be arranged in MS Teams
- General course information, in the Information tab
- Q&A sessions as group calls in General Channel



Zoom



All the lectures are held in Zoom

Attendance is highly encouraged

All students must keep the video ON during the lectures

Recordings are left for your future reference



*We do not guarantee answering e-mail
communication*



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Course Schedule



Lectures schedule

NS'21	Course Programme		MINF4573		
Module coordinator: Prof. Dr Claudio J. Tessone					
Session	Date	Instructor	Programme		
1	Mon, 20.09.2021	CT	Lecture	Kickoff + Network theory	
			Assignment	A1: Network Theory	
2	Mon, 27.09.2021	CT	Lecture	Higher-order properties	
			Assignment	A2: Network properties	
3	Mon, 04.10.2021	CC	Lecture	Centrality and ranking	
			Exercise	A3: Centrality	
4	Mon, 11.10.2021	CT	Lecture	Community detection	
			Assignment		
5	Mon, 18.10.2021	CC	Lecture	Random graphs and small-world	
			Exercise	A4: Communities	
6	Mon, 25.10.2021	CT	Lecture	Scale-free networks	
			Assignment	A5: Scale-free networks	
7	Mon, 01.11.2021	CC	Lecture	Statistical inference	
			Exercise	A6: Statistical inference	



Lectures schedule

NS'21	Course Programme		MINF4573				
Module coordinator: Prof. Dr Claudio J. Tessone							
Session	Date	Instructor	Programme				
8	Mon, 08.11.2021	CT	Lecture	Percolation and robustness			
			Assignment				
9	Mon, 15.11.2021	CC	Lecture	Financial networks			
			Exercise	A7: Financial Networks			
10	Mon, 22.11.2021	CT	Lecture	Spreading phenomena I			
			Assignment				
11	Mon, 29.11.2021	CT	Lecture	Spreading phenomena II			
			Exercise				
12	Mon, 06.12.2021	CC	Lecture	Social networks			
			Assignment				
Fri, 17.12.2021			<i>Submission Final Projects</i>				



Assignments schedule

NS'21	Course Programme	MINF4573		
Module coordinator:	Prof. Dr Claudio J. Tessone			
Session	Date	Assignment Given	Deadline	Final Project
1	Mon, 20.09.2021	A1: Network Theory		
2	Mon, 27.09.2021	A2: Network properties		
3	Mon, 04.10.2021	A3: Centrality	A1	
4	Mon, 11.10.2021		A2	
5	Mon, 18.10.2021	A4: Communities	A3	
6	Mon, 25.10.2021	A5: Scale-free networks		
7	Mon, 01.11.2021	A6: Statistical inference	A4	



Assignments schedule

NS'21	Course Programme	MINF4573		
Module coordinator:	Prof. Dr Claudio J. Tessone			
Session	Date	Assignment Given	Deadline	Final Project
8	Mon, 08.11.2021		A5	<i>Selection begins</i>
9	Mon, 15.11.2021	A7: Financial Networks	A6	
10	Mon, 22.11.2021			<i>Selection ends</i>
11	Mon, 29.11.2021		A7	<i>Coordination</i>
12	Mon, 06.12.2021			<i>Coordination</i>
	Fri, 17.12.2021			<i>Submission Final Projects</i>



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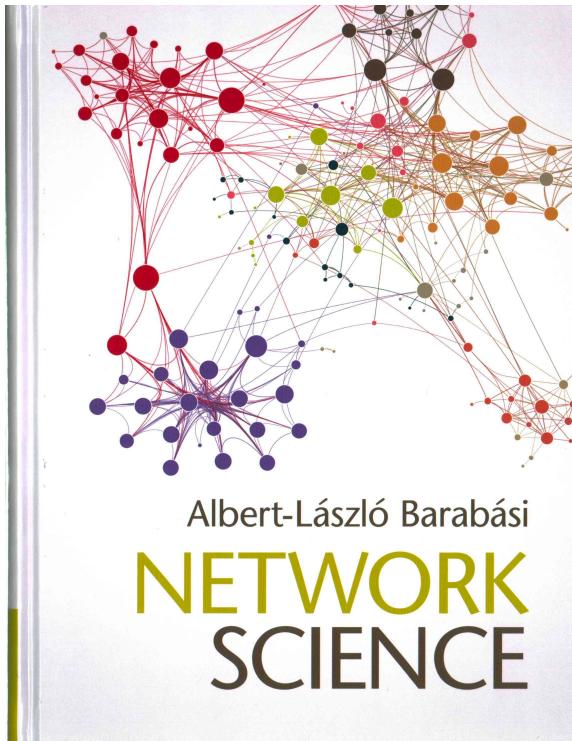
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Bibliography



Primary references



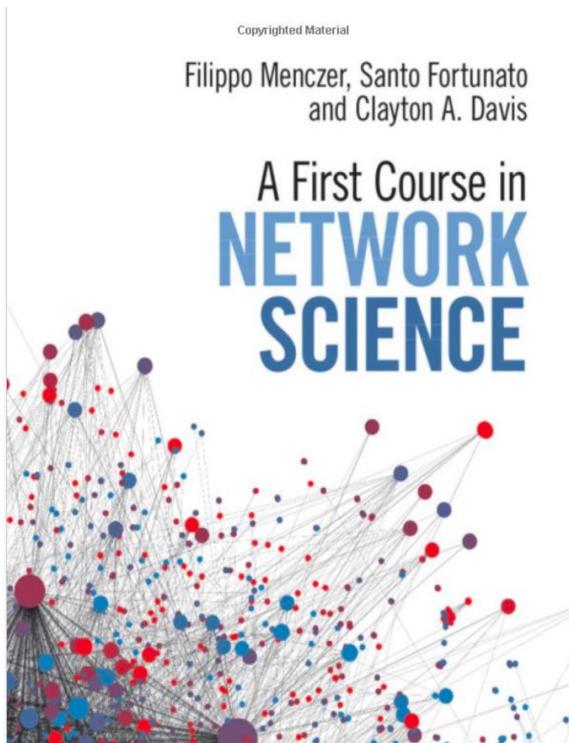
Network Science (2016)

A. L. Barabási

Available online at <http://networksciencebook.com>



Primary references



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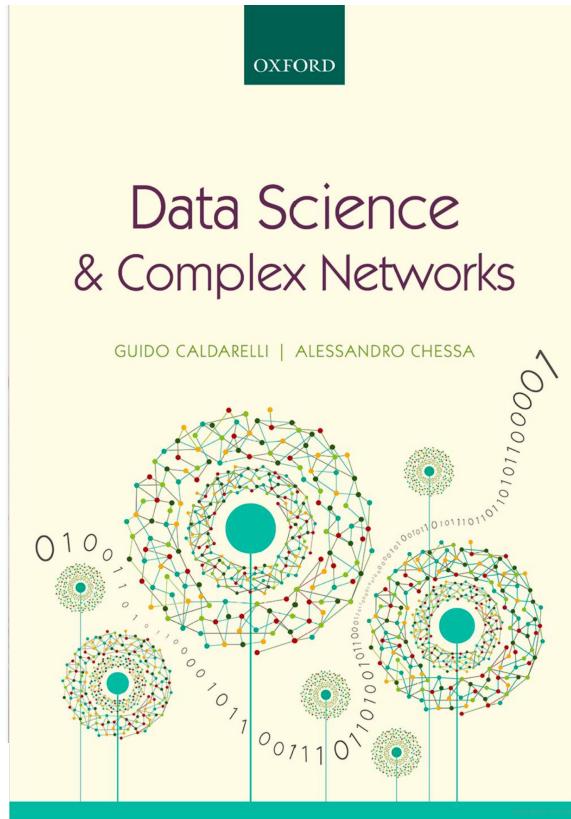
Filippo Menczer, Santo Fortunato
and Clayton A. Davis

A First Course in Network Science (2020)

F. Menczer, S. Fortunato, and C.A. Davis



Primary references



Data Science and Complex Networks (2018)

G. Caldarelli, and A. Chessa



Which programming languages?



Programming language in which all the course will
be explained





Software libraries

- **Matplotlib:**

- <https://matplotlib.org/tutorials/index.html>
- <https://sebastianraschka.com/notebooks/python-notebooks.html>

- **Networkx:**

- <https://networkx.github.io/documentation/stable/tutorial.html>
- <https://www.cl.cam.ac.uk/teaching/1314/L109/tutorial.pdf>

- **Graph-Tool:**

- <https://graph-tool.skewed.de/static/doc/draw.html>



*But you are free to do all exercises in a
different language*

e.g. R + igraph

We will help you to finalise the exercises



Primary references

Install basic packages

```
# pip3 install jupyter  
# pip3 install numpy scipy matplotlib networkx
```

Create a notebook

```
# jupyter notebook
```

Module import conventions

```
# import math as m  
# import numpy as np  
# import matplotlib.pyplot as plt  
# import networkx as nx
```



Questions related to course organisation?



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