



1st term 2020-2021

Social and Political Networks

Time & place: Mondays, 15:00-17:00, via zoom

Given by: Arnout van de Rijt

Open to: all researchers, visiting students, MW fellows and other research fellows at EUI. All participants must attend all meetings and do all assignments and presentations (no audits).

Contact: Monika.Rzemieniecka@eui.eu

Course Description and Objectives

This objective of this course is to introduce SPS researchers to social network analysis. This is both a theory and a methods course. The weekly meetings are organized around a key theoretical concept, hypothesis, notion or insight from social network analysis. In a typical week we read a chapter from a textbook, do the textbook exercises, read a scientific article about networks of people, organizations, or countries that have to do with that key theme, and complete an assignment. During a typical meeting, one (or two jointly, depending on enrollment) researchers present their completed assignment to last week's assignment through Zoom. The instructor then discusses the new readings. After a 5-minute break the instructor leads a virtual practicum on network modeling and/or data analysis, using appropriate social network analysis software (through instructor screen-sharing in Zoom).

Requirements for credit: Attendance: This course requires regular attendance and active participation. Weekly assignments, possibly done in teams (which must change in composition from week to week). The assignments can be uploaded directly on the [Brightspace](#) platform. At least one presentation of a completed assignment through Zoom.

Readings

The textbook we draw on is:

“Networks, Crowds, and Markets” by J. Kleinberg and D. Easley (2009). A free pre-publication copy is available: <https://www.cs.cornell.edu/home/kleinber/networks-book/networks-book.pdf>

Researchers are expected to do readings ahead of the meeting and to complete all textbook exercises in the appropriate chapters. The instructor will not grade these exercises as answer keys undoubtedly circulate online.

In addition, each week a scientific article using social network analysis is assigned.

Schedule

Week 1. October 5, 2020. **Introduction**

Readings:

- Kleinberg & Easley chapters 1, 2

Practicum:

- Handling social network data

Week 2. October 12, 2020. **Social capital**

Due the Friday before at midnight: Assignment 1

Readings:

- Kleinberg & Easley chapter 3
- Granovetter, M. S. (1973). The Strength of Weak Ties. *American Journal of Sociology*, 78(6), 1360-1380.

Practicum:

- Calculating basic network measures

Week 3. October 19, 2020. Homophily and segregation

Due the Friday before at midnight: Assignment 2

Readings:

- Kleinberg & Easley chapter 4
- Schelling, T. C. (1971). Dynamic models of segregation. *Journal of Mathematical Sociology*, 1(2), 143-186.

Practicum:

- Measuring homophily; agent-based modeling

Week 4. October 26, 2020. Structural balance

Due the Friday before at midnight: Assignment 3

Readings:

- Kleinberg & Easley chapter 5
- Doreian, P., & Mrvar, A. (2015). Structural balance and signed international relations. *Journal of Social Structure*, 16, 1.

Practicum:

- Theoretical analysis of balance dynamics; block-modeling

Week 5. November 2, 2020. Exchange networks

Due the Friday before at midnight: Assignment 4

Readings:

- Kleinberg & Easley chapter 12
- Cook, K. S., Emerson, R. M., Gillmore, M. R., & Yamagishi, T. (1983). The distribution of power in exchange networks: Theory and experimental results. *American Journal of Sociology*, 89(2), 275-305.

Practicum:

- Theoretical and empirical analysis of exchange networks

Week 6. November 9, 2020. Structure of the World Wide Web

Due the Friday before at midnight: Assignment 5

Read:

- Kleinberg & Easley chapter 13
- Broder, A., Kumar, R., Maghoul, F., Raghavan, P., Rajagopalan, S., Stata, R., ... & Wiener, J. (2000). Graph Structure in the Web. *Computer Networks*, 33(1-6), 309-320.

Practicum:

- Analysis of internet data

Week 7. November 16, 2020. **PageRank**

Due the Friday before at midnight: Assignment 6

Read:

- Kleinberg & Easley chapter 14
- Fowler, J. H., & Jeon, S. (2008). The Authority of Supreme Court Precedent. *Social Networks*, 30(1), 16-30.

Practicum:

- PageRank, Hubs and Authorities

Week 8. November 23 2020. **Preferential attachment**

Due the Friday before at midnight: Assignment 7

Read:

- Kleinberg & Easley chapter 18
- Barabási, A. L., & Albert, R. (1999). Emergence of scaling in random networks. *Science*, 286(5439), 509-512.

Practicum:

- Preferential attachment models

Week 9. November 30, 2020. **Behavioral cascades**

Due the Friday before at midnight: Assignment 8

Read:

- Kleinberg & Easley chapter 19
- Vasi, I. B., & Strang, D. (2009). Civil liberty in America: The diffusion of municipal bill of rights resolutions after the passage of the USA PATRIOT Act. *American Journal of Sociology*, 114(6), 1716-1764.

Practicum:

- Event-history analysis of diffusion processes

Week 10. **Wednesday, December 9**, 2020. **Small worlds**

Due the Friday before at midnight: Assignment 9

Read:

- Kleinberg & Easley chapter 20
- Watts, D. J., & Strogatz, S. H. (1998). Collective dynamics of ‘small-world’ networks. *Nature*, 393(6684), 440-442.

Practicum:

- Replicating Watts & Strogatz; other small-world models (Kleinberg); small-world analysis of datasets

Week 11. December 14, 2020. **Epidemics**

Due the Friday before at midnight: Assignment 10

Read:

- Kleinberg & Easley chapter 21
- Block, P., Hoffman, M., Raabe, I. J., Dowd, J. B., Rahal, C., Kashyap, R., & Mills, M. C. (2020). Social network-based distancing strategies to flatten the COVID-19 curve in a post-lockdown world. *Nature Human Behaviour*, 1-9.

Practicum:

- Modeling network interventions against COVID-19

Schedule summary

Week	Day	Topic	Text book chapters	Social science article	Practicum
1	October 5	<i>Introduction</i>	Ch 1, 2		Handling social network data
2	October 12	<i>Social capital</i>	Ch 3	Granovetter (1973)	Calculating basic measures
3	October 19	<i>Homophily & segregation</i>	Ch 4	Schelling (1973)	Agent-based modeling
4	October 26	<i>Balance</i>	Ch 5	Doreian & Mrvar (2015)	Structural balance
5	November 2	<i>Exchange</i>	Ch 12	Cook et al. (1983)	Analysis of exchange networks
6	November 9	<i>WWW</i>	Ch 13	Broder et al. (1999)	Analysis of internet data
7	November 16	<i>Pagerank</i>	Ch 14	Fowler & Jeon (2008)	PageRank, hubs and authorities
8	November 23	<i>Preferential attachment</i>	Ch 18	Barabási & Albert (1999)	Preferential attachment models
9	November 30	<i>Behavioral cascades</i>	Ch 19	Vasi & Strang (2009)	Event-history analysis of diffusion
10	December 7	<i>Small worlds</i>	Ch 20	Watts & Strogatz (1998)	Small-world models and analysis
11	December 14	<i>Epidemics</i>	Ch 21	Block et al. (2020)	Network interventions against Covid