

## Master of International Relations/Political Science

Academic year 2021–2022

### Social Networks Theories and Methods

IRPS093 – Fall – 6 ECTS

#### Course Description

Networks represent the structure of relations among entities. Researchers of politics, sociology, economics, history, and law employ networks to analyse and model social and political structures and the agency of actors to construct and change them. This introductory course aims to enable students to be discriminating consumers of network literature and advanced users of network techniques. We will learn core theories, measures, and models used in social and political networks, and discuss how networks are structured, change, and affect the entities they connect. Theory is matched with practical exercises conducted in R. No prior knowledge of R is required, though basic statistics (i.e. regression especially logistic regression) is highly recommended.

#### PROFESSOR

James Hollway

[james.hollway@graduateinstitute.ch](mailto:james.hollway@graduateinstitute.ch)

Office hours:

Zoom 945-053-3848,  
Tuesdays, 14–16

#### ASSISTANT

Andrea Biswas Tortajada

[andrea.biswas@graduateinstitute.ch](mailto:andrea.biswas@graduateinstitute.ch)

Office hours:

Thursdays, 16–18

## Syllabus

### Course Aims

This introductory course aims to enable students to be discriminating consumers of network literature from across the social sciences and advanced users of network techniques.

### Course Structure

This survey course consists of two main sections. The first half of the course describes and analyses social networks, or what is called “network analysis.” The second half builds on this by exploring how we can explain network structures or other aspects of socio-political life and investigate relational mechanisms using networks, or what is called “network modelling.” The main lecture programme covers central concepts in the network literature and discusses how these concepts are theoretically motivated, methodologically operationalized, and applied. Various in-class exercises encourage familiarity and reflection on these concepts. Overflow practical sessions will offer the opportunity to work through a script in R (so do bring your laptops). These practical exercises help connect the concepts discussed in the lecture to the practical exercises.

## Course Materials

There is no required textbook for this course, however many of the books and journals contained in the remainder of the syllabus also hold additional or alternative readings that may be useful for deepening your understanding of network theory and/or methods in preparation for your presentations, the exam, and/or your own research. Please approach me during my office hours if there is a particular theme or topic you would like to learn more about.

For a fairly comprehensive overview of current topics, see:

- Scott, John, and Peter J Carrington. 2011. *The SAGE Handbook of Social Network Analysis*. London: SAGE Publications.

For more recent applications, especially of multimodal network analysis, to various political networks, please see:

- Knoke, David, Mario Diani, James Hollway, and Dimitrios C Christopoulos. 2021. *Multimodal Political Networks*. Cambridge: Cambridge University Press.

In terms of software, we will be using the free statistical software R. Don't worry if you haven't used R before, we will start from the basics. We will begin in the first lesson with getting acquainted with the software though, so make sure you bring your laptop with you, ideally with R ([www.r-project.org](http://www.r-project.org)) and RStudio ([www.rstudio.com](http://www.rstudio.com)) already installed! For general support with the practical component of the course, see:

- Kolaczyk, Eric D, and Gábor Csárdi. 2014. *Statistical Analysis of Network Data with R*. New York: Springer.

## Course Evaluation

Evaluation for the course consists of three parts:

**Exercises (10%)** Submit 10 weekly exercises by following Sunday night, graded for completion only.

**Participation (10%)** Submit answers *and* questions about conceptual or practical matters on Moodle. Nonlinear grading scheme rewards all those who put the extra effort in to understand/help others understand.

**Report (30%)** At the end of the network analysis section, an assignment will be given that requires students to practice applying the theory and methods learned to new datasets. Datasets and further instructions will be provided when the report assignment is issued.

**Poster (50%)** At the end of the course, students prepare and present posters summarising the results of analysing and modelling a relational dataset of the student's choice. The precise format will depend on the sanitary condition etc. I encourage you to begin identifying a relevant dataset/research question early. We will provide consultancy sessions in week 13 to support your projects.

## Course Policies

*Auditing* is not possible in this course at this time.

*Grading* is according to a 20 point scale. I reserve the right to rescale the final grades at the end of the course, but as a general guide a 10 is roughly a passing grade.

*Plagiarism* means presenting another's thoughts, ideas, or expressions as one's own, and is a breach of academic integrity that is not tolerated at the Graduate Institute. Students who present others' work as their own may receive a 0. Please cite appropriately and contact the TA if you have any doubts.

**This syllabus is subject to cantonal and Institute policies in response to the pandemic.**

## Course Schedule

### Week 1 (21 Sep): Networks, or How to talk networks

- Lazer, David (2011). "Networks in political science: Back to the future". *PS: Political Science and Politics*, 44(01), 61–68.
- Prell, Christina (2012). "A brief history of social network analysis". In *Social network analysis: History, theory and methodology* (19–52). SAGE.
- Brandes, Ulrik, Robins, Garry L., McCranie, Ann, & Wasserman, Stanley (2013). "What is network science?". *Network Science*, 1(1), 1–15.

### Week 2 (28 Sep): Relations, or How to find networks

- Mische, Ann (2011). "Relational sociology, culture, and agency". In P. J. Carrington & J. Scott (Eds.), *The sage handbook of social network analysis* (80–97). SAGE.
- Robins, Garry L. (2015). "Thinking about networks: Research questions and study design". In *Doing social network research* (39–62). SAGE.
- Marsden, Peter V. (2005). "Recent developments in network measurement". In P. J. Carrington, J. Scott, & S. Wasserman (Eds.), *Models and methods in social network analysis* (8–30). Cambridge University Press.

### Week 3 (5 Oct): Centrality, or How to stand out

- Smith, Jason M., Halgin, Daniel S., Kidwell-Lopez, Virginie, Labianca, Giuseppe, Brass, Daniel J., & Borgatti, Stephen P. (2014). "Power in politically charged networks". *Social Networks*, 36, 162–176.
- Fowler, James H. (2006). "Connecting the congress: A study of cosponsorship networks". *Political Analysis*, 14(4), 456–487.
- Brandes, Ulrik, Kenis, Patrick N., Raab, Jörg, Schneider, Volker, & Wagner, Dorothea (1999). "Explorations into the visualization of policy networks". *Journal of Theoretical Politics*, 11(1), 75–106.

#### **Week 4 (12 Oct): Community, or How to stand together**

- Newman, M. E. J. (2012). "Communities, modules and large-scale structure in networks". *Nature Physics*, 8(1), 25–31.
- Maoz, Zeev (2006). "Network Polarization, Network Interdependence, and International Conflict, 18162002". *Journal of Peace Research*, 43(4), 391–411.
- Kadushin, Charles (2012). "The psychological foundations of social networks". In *Understanding social networks: Theories, concepts, and findings* (56–73). Oxford University Press.

#### **Week 5 (19 Oct): Actors, or How to get things**

- Burt, Ronald S. (2004). "Structural holes and good ideas". *The American Journal of Sociology*, 110(2), 349–399.
- Padgett, John, & Ansell, Christopher K. (1993). "Robust action and the rise of the medici, 1400-1434". *The American Journal of Sociology*, 98, 1259–1319.
- Knoke, David, Diani, Mario, Hollway, James, & Christopoulos, Dimitrios (2021). "Multimodal Graphs and Matrices". In *Multimodal Political Networks* (20–52). Cambridge University Press.

#### **Week 6 (26 Oct): –no class–**

#### **Week 7 (2 Nov): Structures, or How to share things**

- Merton, Robert K. (1968). "The matthew effect in science". *Science*, 159(3810), 56–63.
- Watts, Duncan J. (2004). "The 'new' science of networks". *Annual Review of Sociology*, 30, 243–270.
- Graham, Erin R., Shipan, Charles R., & Volden, Craig (2012). "The diffusion of policy diffusion research in political science". *British Journal of Political Science*, 43(3), 1–29.

#### **Week 8 (9 Nov): Network Linear Models, or How to model (weighted) networks**

- McPherson, Miller, Smith-Lovin, Lynn, & Cook, James M. (2001). "Birds of a feather: Homophily in social networks". *Annual Review of Sociology*, 27, 415–444.
- Robins, Garry L., Lewis, Jenny M., & Wang, Peng (2012). "Statistical network analysis for analyzing policy networks". *Policy Studies Journal*, 40(3), 375–401.
- Lee, In Won, Feiock, Richard C., & Lee, Youngmi (2012). "Competitors and cooperators: A micro-level analysis of regional economic development collaboration networks". *Public Administration Review*, 72(2), 253–262.

#### **Week 9 (16 Nov): Network Logistic Models, or How to model (multilevel) networks**

- Amati, Viviana, Lomi, Alessandro, & Mira, Antonietta (2018). "Social network modeling". *Annual Review of Statistics and Its Application*, 5(1), 343–369.
- Koskinen, Johan H., & Daraganova, Galina (2013). "Exponential random graph model fundamentals". In D. Lusher, J. H. Koskinen, & G. L. Robins (Eds.), *Exponential random graph models for social networks* (16–28). Cambridge University Press.
- Lubell, Mark N., Robins, Garry L., & Wang, Peng (2014). "Network structure and institutional complexity in an ecology of water management games". *Ecology and Society*, 19(4), art23.

#### **Week 10 (23 Nov): Network Panel Models, or How to model (longitudinal) networks**

- Snijders, Tom A. B., Van de Bunt, Gerhard G., & Steglich, Christian E. G. (2010). "Introduction to stochastic actor-based models for network dynamics". *Social Networks*, 32(1), 44–60.
- Steglich, Christian E. G., Snijders, Tom A. B., & Pearson, Michael (2010). "Dynamic networks and behavior: Separating selection from influence". *Sociological Methodology*, 40(1), 329–393.
- Manger, Mark S., & Pickup, Mark A. (2016). "The coevolution of trade agreement networks and democracy". *Journal of Conflict Resolution*, 60(1), 164–191.

#### **Week 11 (30 Nov): Network Event Models, or How to model (time-stamped) networks**

- Butts, Carter T. (2008). "A relational event framework for social action". *Sociological Methodology*, 38, 155–200.
- Stadtfeld, Christoph, Hollway, James, & Block, Per (2017). "Dynamic network actor models: Investigating coordination ties through time". *Sociological Methodology*, 47(1), 1–40.
- Hollway, James (2020). "Network Embeddedness and the Rate of Water Cooperation and Conflict". In M. Fischer & K. Ingold (Eds.), *Networks in Water Governance* (87–113). Springer International Publishing.

#### **Week 12 (7 Dec): Review**

#### **Week 13 (14 Dec): Consultations**

#### **Week 14 (21 Dec): Posters due**

– This syllabus is subject to change –