Game Theory: Syllabus

Instructor: Xiang Sun

Wuhan University, Economics and Management School
Academic Year 2019–2020, Semester 1

Chinese title: 博弈论

Prerequisite: Calculus, Probability, Linear Algebra, Basic Game Theory

Course description: This course provides an overview and synthesis of research on social and economic networks, drawing on studies by sociologists, economists, computer scientists, physicists, and mathematicians.

The course begins with some empirical background on social and economic networks, and an overview of concepts used to describe and measure networks. Next, we will cover a set of models of how networks form, including random network models as well as strategic formation models, and some hybrids. We will then discuss a series of models of how networks impact behavior, including contagion, diffusion, learning, and peer influences.

Modular credit: 3 modular credits

Modular number: EC412/1400036

Time: Week 1–9, Tuesday and Thursday, 14:05–16:30

Venue: 枫-203

Module website: https://www.xiangsun.org/teaching, for announcements and lecture notes downloading.

Instructor: 孙祥

- E-mail: xiangsun.econ@gmail.com.
  - Before asking questions, please briefly read 提问的智慧.
  - Before sending e-mails, please read Topic 7 in WISE 学生礼仪指南.
- Homepage: https://www.xiangsun.org.
- Office: Room A501-2, Liangsheng Building
- Telephone: +86 027 6875 5072
- Mailbox: 11-13

Office hours: By email appointment

Teaching assistants: 任敦薇

Main references:

[J] Matthew O. Jackson, *Social and Economic Networks*, Princeton University Press, 2008.
The electronic version is available at archive.org.
The corresponding MOOC: Social and Economic Networks: Models and Analysis.

[EK] David Easley and Jon Kleinberg, *Networks, Crowds, and Markets: Reasoning about a Highly Connected World*, Cambridge University Press, July 19, 2010.
中文翻译：大卫·伊斯利，乔恩·克莱因伯格，网络、群体与市场，清华大学出版社，2011。

[O] *The Oxford Handbook of the Economics of Networks* (Edited by Yann Bramoullé, Andrea Galeotti, and Brian Rogers), Oxford University Press, 2016.

[BCZ1] Coralio Ballester, Antoni Calvó-Armengol, and Yves Zenou, Who's Who in Networks. Wanted: The Key Player.

[BK] Yann Bramoullé and Rachel Kranton, Public goods in networks.

[GG] Andrea Galeotti and Sanjeev Goyal, The Law of the Few.

[BBD] Mohamed Belhaj, Sebastian Bervoets, and Frédéric Deroïan, Efficient networks in games with local complementarities.

Language:

	Lecture notes	Lectures	Homework sets	Mid-term test	Final examination
Chinese		✓			
English	✓	✓	✓		✓

Supplementary readings:

- Matthew O. Jackson, *The Human Network: How Your Social Position Determines Your Power, Beliefs, and Behaviors*, Pantheon, 5 March 2019.
  中文翻译：马修·杰克逊，人类网络，中信出版社，2019。
- 郑路，社会网络 *20* 讲，得到App 课程。
- Albert-László Barabási, *Network Science*, Cambridge University Press, August 5, 2016.
  The electronic version is available at `http://networksciencebook.com/`.
- Daron Acemoglu and Matthew O. Jackson, *Theory and Application of Network Models*, NBER Summer Institute 2014 Methods Lectures, 2014.
- Symposium: Social Networks (Fall 2014), *Journal of Economic Perspectives*.
- MOOC: Networks Illustrated: Principles without Calculus.

Grading:

- 10% for the class performance,
- 50% for the individual presentation on the chosen paper,
- 40% for the individual report on the chosen paper.

The selection criteria for a paper to present/report are as follows:

- 2005 or more recent.
- Related to the topics covered.
- Published on *Science*, *Econometrica*, *American Economic Review*, *Journal of Political Economy*, *Quarterly Journal of Economics*, *Review of Economic Studies*, *Journal of Economic Theory*, *Theoretical Economics*, *Games and Economic Behavior*, *RAND Journal of Economics*, *American Economic Journal: Microeconomics*.
- The chosen paper should be submitted to me for my approval before Nov. 15, 2019.

The criteria for presentation are as follows:

- The presentation could be done online, e.g., via QQ, WeChat, or Skype.
- The presentation should be complete before Dec. 29, 2019.
- The date/time of the presentation should be determined together with the chosen paper.
- The presentation should be at most 20 minutes.
- The slides for presentation should be organized as follows: Motivation, Model, Main Result, Interpretation/Implication, Conclusion.

The criteria for report are as follows:

- The report needs to be written in A4 paper, and the number of pages is between 2 and 3.
- The report should be written in Chinese, except terminologies.
- The report should be organized as follows: Motivation, Model, Main Result, Interpretation/Implication, Conclusion.
- The report should be submitted before Jan. 10, 2020.
- The report can be submitted via 快递. My mailing address can be found on my website.

Course outline:

- Part 1: Lectures 1–3, Description of networks
- Part 2: Lectures 4–7, 14, Network formation
- Part 3: Lectures 8–14, Behaviors in networks

Tentative time table:

Week	Lecture	Date	Sections	Topics	Remark
1	1	Sep. 3	[J] 1	Introduction	
1	2	Sep. 5	[J] 2	Representing and measuring networks 1	
2	3	Sep. 10	[J] 2–3	Representing and measuring networks 2	
2	4	Sep. 12	[J] 4	Static random networks 1	
3	5	Sep. 17	[J] 4	Static random networks 2	
3	6	Sep. 19	[J] 5	Growing random networks	
4	7	Sep. 24	[J] 6	Strategic network formation (cooperative)	
4	8	Sep. 26	[J] 7	Diffusion through networks	
5		Oct. 1			Holiday
5		Oct. 3			Holiday
6	9	Oct. 8	[J] 7.3, [EK] 20	Navigation	
6	10	Oct. 10	[EK] 14	Web search	
7	11	Oct. 15	[J] 8, [EK] 16	Learning on networks	
7	12	Oct. 17	[J] 9	Games	
8	13	Oct. 22	[EK] 8	Transportation network	
8	14	Oct. 24	[BCZ1] [BK] [GG] [BBD]	Games and Strategic network formation	
11		Nov. 15		Paper selection	
18		Dec. 29		Presentation	
19		Jan. 10		Report submission	