

# Economics of Networks

Module 4, 2023-2024

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## Course information

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**Course Website:** [my.nes.ru](http://my.nes.ru)

**Instructor's Office Hours:** TBD

**Class Time:** TBD

**Room Number:** TBD

**TA:** Alexander Tonis ([atonis@nes.ru](mailto:atonis@nes.ru))

## Course description

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- We live in a connected society, and these connections can have a huge impact on our lives. With the rise of social media (Facebook, Twitter, etc), it has become clear that social networks can influence what we know, what we buy, and how we vote. However, connections (or networks) have always been influential to our lives. For instance, it is common knowledge that personal connections (Social Networks) matter in finding jobs. Similarly, the financial crisis of 2007-2008 was driven by connections between banks (Financial Networks). And finally, the global economy depends on trading connections/relationships between countries (Trade Networks).
- This course provides an introduction to the Economics of Networks. We will consider how network structures impact behavior, which network structures are likely to emerge in a society, and the overall influence of various networks on economic and social outcomes.
- We will mainly focus on theoretical parts of the literature; however, this field began mainly theoretical, and so we will be able to cover many of the seminal papers.

## Course requirements, grading, and attendance policies

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- Course prerequisites include Game Theory.  
Knowledge of Graph Theory is a plus but not required.

- Course grade will be based on presentations (30%) and a paper proposal (70%).
  - Each class (except the first class), we will have a seminar style presentation.
    - ➔ One student (the “presenter”) will present a paper from the syllabus (50 minutes). Both the presenter and the paper are pre-selected by me.
    - ➔ After the presentation ends, I will randomly select one student (the “discussant”) to evaluate the paper by giving pros and cons (15 minutes).
    - ➔ Then, we will have a chance for the rest of the audience to give their opinions (25 minutes).
    - ➔ During Tutorials, TA will go over the technical aspects of the paper in more details.

\*GRADING: For every performance, you can receive “Bad”, “Good”, or “Excellent”.

Grade will be based on your weighted average performance as the presenter and as the discussant, where 50% weight is on your average performance as the presenter and 50% weight is on your average performance as the discussant.

If you are never selected to be the discussant, then all the weight goes to your presentations.

If I randomly select your name to be the discussant and you are not in class, you will receive “Bad”. So if you are unable to attend a class for a valid reason, then please let me know ahead of time and I won’t select you to be the discussant that day.

- Paper proposal should provide a clear motivation, some preliminary results, and discuss potential contributions to the literature.
  - ➔ Students are free to choose any topic from the course contents below.
  - ➔ For the first 7 lectures, we will present papers highlighted in yellow below, and then I will select 7 more papers based on preferences of the students. So you will have the opportunity to select papers that are closely related to your research proposal idea.

\*GRADING: your grade will mainly come from convincing me that you have a clear direction for the project; that is, your motivation is valid, your results are plausible (you don’t necessarily need to prove everything, but have clear conjectures), and that your contributions to the literature are valuable.

## **Textbooks**

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- Jackson, Matthew O. 2008. *Social and Economic Networks*. Princeton: Princeton University Press.
- Goyal, Sanjeev. 2009. *Connections: An Introduction to the Economics of Networks*. Princeton: Princeton University Press.

## **Course contents**

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Topic 1: Introduction to Networks

- Measurements – neighborhoods, clustering, centrality.
  - Jackson (2008), Chapters 1 to 3

- Goyal (2009), Chapter 1

## Topic 2: Network Formation

- Random Network Formation
  - Jackson (2008), Chapters 4 & 5
  - Watts & Strogatz (1998)
  - Jackson & Rogers (2007)
- Strategic Network Formation
  - Jackson (2008), Chapters 6 & 11
  - Goyal (2009), Chapters 7 to 9
  - Jackson & Wolinsky (1996)
  - Bala & Goyal (2000)
  - Safi (2022)\*

## Topic 3: Games Played on Networks

- Peer Effects
  - Jackson (2008), Chapter 9
  - Goyal (2009), Chapter 3
  - Ballester, Calvo-Armengol, and Zenou (2006)
  - Belhaj, Derorian, and Safi (2023)\*
- Public Goods
  - Jackson (2008), Chapter 9
  - Goyal (2009), Chapter 3
  - Bramouille & Kranton (2007)
  - Bramouille, Kranton, and D'amours (2014)

## Topic 4: Networked Markets

- Labor Market
  - Jackson (2008), Chapter 10
  - Goyal (2009), Chapter 6
  - Montgomery (1991)
  - Calvo-Armengol (2004)
  - Calvo-Armengol & Jackson (2004, 2007)
- Goods Market
  - Jackson (2008), Chapter 10
  - Kranton & Minehart (2001)
- Financial Market
  - Jackson (2008), Chapter 10
  - Elliott, Golub, and Jackson (2014)
  - Acemoglu, Ozdaglar, and Tahbaz-Salehi (2015)
- International Trade Market

- Jackson (2008), Chapter 10
- Goyal & Joshi (2006)

#### Topic 5: Other Influences of Networks

- Learning and Information Aggregation
  - Jackson (2008), Chapter 8
  - Acemoglu, Dahleh, Lobel, and Ozdaglar (2011)
  - Golub & Jackson (2012)
- Informal Borrowing
  - Karlan, Mobius, Rosenblat, and Szeidl (2009)
  - Jackson, Rodriguez-Barraquer, and Tan (2012)
- Collaborations as a Technology
  - Goyal (2009), Chapter 10
  - Goyal & Joshi (2003)

### **Academic integrity policy**

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Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.

### **References**

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Acemoglu, Daron, Munther A. Dahleh, Ilan Lobel, and Asuman Ozdaglar. 2011. "Bayesian Learning in Social Networks." *Review of Economic Studies*, 78 (4):1201-1236.

Acemoglu, Daron, Asuman Ozdaglar, and Alireza Tahbaz-Salehi. 2015. "Systemic Risk and Stability in Financial Networks." *American Economic Review*, 105 (2):564– 608.

Bala, V. and S. Goyal. 2000. "A noncooperative model of network formation." *Econometrica*, 68 (5):1181–1229.

Ballester, C., A. Calvo´-Armengol, and Y. Zenou. 2006. "Who's who in networks, wanted: the key player." *Econometrica*, 74 (5):1403–1417.

Belhaj, Mohamed, Frederic Derorian, and Shahir Safi. 2023. "Targeting in Networks Under Costly Agreements." *Games and Economic Behavior*, 140:154-172.

Bramouille, Y. and R. Kranton. 2007. "Risk-sharing networks." *Journal of Economic Behavior & Organization*, 64 (3-4):275–294.

Bramouille, Yann, Rachel Kranton, and Martin D'amours. 2014. "Strategic interaction and networks." *American Economic Review*, 104 (3):898–930.

Calvo-Armengo, Antoni. 2004. "Job Contact Networks." *Journal of Economic Theory*, 115 (1):191-206.

- Calvo-Armengol, Antoni and Matthew O. Jackson. 2004. "The effects of social networks on employment and inequality." *American Economic Review*, 94 (3):426–454.
- Calvo-Armengol, Antoni and Matthew O. Jackson. 2007. "Networks in labor markets: Wage and employment dynamics and inequality." *Journal of Economic Theory*, 132 (1):27–46.
- Elliott, Matthew, Benjamin Golub, and Matthew O. Jackson. 2014. "Financial Networks and Contagion." *American Economic Review*, 104(10):3115–3153.
- Golub, Benjamin and Matthew O. Jackson. 2012. "How Homophily Affects the Speed of Learning and Best-Response Dynamics." *Quarterly Journal of Economics*, 127 (3):1287–1338.
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- Jackson, Matthew O. and Brian W. Rogers. 2007. "Meeting strangers and friends of friends: How random are social networks?" *American economic review*, 97 (3):890–915.
- Jackson, Matthew O., Tomas R. Rodriguez-Barraquer, and Xu Tan. 2012. "Social Capital and Social Quilts: Network Patterns of Favor Exchange." *American Economic Review*, 102 (5):1857–1897.
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- Watts, Duncan J. and Steven H. Strogatz. 1998. "Collective dynamics of small-world networks." *Nature*, 393 (6684):440–442.