



# Exchange programme Vrije Universiteit Amsterdam

Vrije Universiteit Amsterdam - Exchange programme Vrije Universiteit Amsterdam - 2024-2025

## Exchange

Vrije Universiteit Amsterdam offers many English-taught courses in a variety of subjects, ranging from arts & culture and social sciences, neurosciences and computer science, to economics and business administration.

The International Office is responsible for course approval and course registration for exchange students. For details about course registration, requirements, credits, semesters and so on, please [visit the exchange programmes webpages](#).

# Mathematical Economics II

Course Code	E_EOR2_ME2
Credits	6
Period	P4+5
Course Level	200
Language Of Tuition	English
Faculty	School of Business and Economics
Course Coordinator	dr. I.D. Lindner
Examiner	dr. I.D. Lindner
Teaching Staff	prof. dr. J.L. Moraga Gonzalez, dr. I.D. Lindner
Teaching method(s)	Study Group, Lecture, Written partial exam

## Course Objective

The past two decades have seen a growing public and scientific fascination about the complex “connectedness” of modern society and markets. At the heart of this fascination is the idea of a network: the architecture of interconnections. This aspect permeates our social and economic lives in countless ways. Social networks play a central role in the transmission of information, how we vote, how diseases spread, whether we become criminals, what products we buy, which education we choose, and it highly impacts the likelihood of succeeding professionally. Furthermore, agents build their business relationships and networks anticipating the outcomes that result from this interaction. Network aspects also explain why many economic environments of interest are dominated by a few agents, be individuals or firms. Think for example of scientists competing for publicizing their work, pharma firms engaging in R&D for the development of new drugs, or online travel agents trying to attract hotels and travelers to their websites. The choices of these interconnected agents have far-reaching effects not only on prices, quantities, and the direction of innovation, and may cause wide repercussions throughout the economy.

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

Next, keeping an eye on the current pressing problems in business and society, the course centers around strategic behavior in markets and networks, both from the business perspective as well as from the societal viewpoint. We will discuss competition in the presence of network externalities, market power and abuse of dominant position, the formation of R&D collaboration alliances, the impact of cross-ownership on the intensity and the direction of innovation, information frictions in consumer and labor markets, consumer search, advertising models and search engine sponsored ad auctions.

This course fits in the VU profile themes ‘Governance for Society’, ‘Connected World’, and ‘Science for Sustainability’.

## Course Content

### Part 1: Social and Economic Networks (Ines Lindner)

#### 1. Representing and measuring networks

Applications: the architecture of social and economic networks, informal norm enforcement, social capital, Google page rank, citation network

#### 2. Random Growing Networks

Applications: world wide web, small world phenomenon, romantic and sexual networks, collaboration networks

#### 3. Strategic network formation

Applications: social media, collaboration networks, co-author networks

#### 4. Diffusion on Networks

Applications: epidemics, health policies, diffusion of innovation, regulation of financial networks

#### 5. Learning on Networks

Applications: opinion dynamics, belief formation, fake news, wisdom of crowd

#### 6. Games on Networks

Applications: public goods, R&D networks

### **Part 2: Networks and Markets (José Luis Moraga Gonzalez)**

#### 1. Selling network goods

Applications: hardware and software markets, videogames, apps

#### 2. Competition in markets for network goods

Applications: telephone networks, standards wars, public policy in network markets

#### 3. Consumer search and advertising

Applications: price comparison sites (pricewise.nl), online travel agents (booking.com, expedia)

#### 4. Search engines on the internet Intermediaries

Applications: price comparison sites (pricewise.nl), online travel agents (booking.com, expedia)

#### 5. Business relations and the intensity and direction of innovation

Applications: investment funds, mergers

#### 6. Auctions

Applications: eBay auctions, Google sponsored ads

### **Additional Information Teaching Methods**

Classes. During the class meetings, time will be made for discussing exercises. This course uses a blended learning approach. That means that students are asked to prepare the classroom meetings by reading articles and/or watching clips. Student's learning progress is monitored by weekly quizzes.

### **Method of Assessment**

Intermediate exam – Individual assessment

Final exam – Individual assessment

Individual assignment - Individual assessment

Quizzes in classroom - Individual assessment

### **Entry Requirements**

-

### **Literature**

- Syllabus on Canvas (including selected research articles and book chapters)
- Jackson, M.O (2010), Social and Economic Networks, Princeton University Press, Available as paperback or ebook.

### **Additional Information Target Audience**

Second year EOR/EDS

### **Recommended background knowledge**

Linear Algebra, Analysis I, Probability Theory