

**YALE UNIVERSITY
SYLLABUS (TENTATIVE)
SPRING 2018, ECON 433b**



THE ECONOMICS OF SPACE



General Information:

Instructor: Costas Arkolakis

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Office Hours: Mon 10:15-11:15am & by apt.

Lecture: Mon and Weds, 09:00 – 10:15am, WTS B60

Teaching Fellow (TF): TBA. Email: TBA

Office Hours: TBA. TF session: TBA.

Course Description

How does space and the innovations in transportation and communication methods affect the allocation of economic activity across locations? This course will develop the required tools to understand how space shapes economic activity and leads to regional disparities in income and population. We will model space as a network of links and use basic mathematics from the analysis of networks and linear algebra to characterize the endogenous allocation of production and economic agents across space. Using this framework we will then discuss how geospatial data can be analyzed using GIS software to understand the impact of innovations in transportation and communication on shaping economic activity across space. Finally, we will discuss frontier research in spatial economics pertaining to the effects of agglomeration forces, amenities, infrastructure investment, the formation of cities, and the historical aspects of American Urbanization.

Course Structure

The course is designed to train students in the use of data and models to analyze the impact of space in economic activity. The course will start with a detailed accounting of data sources for spatial data. The instructor and TF of the course will teach students how to use detailed information on income, population and geographical data together with GIS software. The course then will proceed in analyzing a geographical network and how existing computational tools can be used to analyze the optimal routing problem. Finally, the course will define and analyze an appropriate theoretical framework for understanding the impact of infrastructure policies in a context with agglomeration forces, amenities and costs of moving goods across space. Linear algebra techniques for analyzing this framework will be discussed. The final part of this course will discuss how this model can be used to plan optimal infrastructure policies and conduct optimal city design.

Background

The prerequisite for this class is Multivariate Calculus or Instructors' consent.

Notes for the class

There will be no official textbook for this class. Material for the class will be derived from class notes posted on the class website. We will also cover a number of papers as indicated in

the tentative class schedule below. Relevant class material will be uploaded on the class website.

Other useful textbooks

Arthur O’Sullivan, Urban Economics, 8th edition, McGraw and Hill.

Jan K. Brueckner, Lectures on Urban Economics, MIT Press,

Edward Glaeser, Cities, Agglomeration and Spatial Equilibrium, Oxford University Press (advanced)

Masahisa Fujita, Paul Krugman and Anthony J. Venables, The Spatial Economy, MIT Press (even more advanced)

Class Web Page and email contact.

I will post all the class material on the class website. You can also email me at costas.arkolakis@yale.edu provided that you put in the subject of the email “ECON 433”.

Midterm exam, final exam, and problem sets. In the midterm and final exam and the three problem sets the students must illustrate that they have comprehended the class material. You are supposed to work independently and violations of academic integrity will be taken seriously. The final exam will take place on May 5th, 7:00pm at WLH 113 .

Grading Criteria:

The weights for the final grade will be as follows:

Final:	30%
Class Participation	10%
3 Problem Sets	10% each
Midterm	30%

Guest Lectures

There will be guest lectures that will be part of the regular class. Visitors will be people with years-long experience in research in spatial economics. The dates of these lectures will be announced in class.

Tentative Course Schedule

Date	Lecture
Week 1	Spatial Facts and Basic Elements
Week 2	A Model of Spatial Equilibrium
Week 3	Modeling Space and the Network of Locations
Week 4	Agglomeration Economies/ Amenities and the City
Week 5	The Routing Problem
Week 6	Topics in Spatial Economics
Week 7	Spatial Data Sources
Week 8	Using GIS software to Process Spatial Data
Week 9	Spatial Equilibrium Within and Across Cities
Week 10	Solving for Spatial Equilibria
Week 11	The Gains from Infrastructure Investment
Week 12	Formation of the City and Optimal City Design
Week 13	Review of Material