Course Description  This course sequence provides a graduate-level topics class in Industrial Organization (IO). In this part of the sequence, I will focus on covering dynamics, multi-unit auctions, economic regulation, pass-through, and computational methods. I will emphasize applications in energy and environmental to show how to use these models and tools in practice. I will also emphasize some energy and environmental applications close to my research agenda.

Lecture notes and textbooks  Most of the classes will be based on slides that will be made available through Canvas. I will occasionally use the blackboard. Even though the class will be mostly structured around papers, it will be essential that you read the assigned handbook chapters. Handbook chapters are an extraordinary resource to get started in a research area.

Grading  Your course grade will be based on the weighted average of your weekly discussions/presentations (20%), problem sets (40%) and a referee reports (40%). Class participation will be taken into account at the margin, and included as part of the weekly discussions. Grading (and pretty much everything else in this syllabus) might be altered to deal with the uncertainties of Covid-19.

Assigned readings  There will be required readings for each class, which will be marked with an asterisk (*). I strongly recommend you to do the readings before class, as it will allow you to understand the material better. Please, post one comment before each class on what you got from the reading. I might ask one of you to share your impressions briefly with the rest of the class during the class discussion.

Problem sets  There will be two problem sets during the course and two referee reports. The problem sets will enable you to learn how to practically implement the methods learnt in class. Some of the problem sets might be tricky at first, but they will
force you to fight against the machine. You can work on the problem sets in groups of two to three people (collaboration is highly encouraged).

**Other notes** Please, reach out if you, like many of us, are struggling these days. My hope is that each of you will be able to learn as much as feasible considering the circumstances. That bar might be very different for each of you, and I plan to accommodate accordingly.

**Calendar**

**DISCLAIMER.** This calendar is tentative and incomplete. Please check most current version of class schedule on the Canvas module section.

**Module 1 - Week 1: Single Agent Dynamics I**

Methods. Applications.

- Section 3 in Ackerberg, Benkard, Berry, and Pakes (2007) “Econometric tools for analyzing market outcomes”
- (*) Su and Judd (2012) “Constrained Optimization Approaches to the Estimation of Structural Models”
Module 1 - Week 2: Single Agent Dynamics II

Applications. Identification.


Module 2 - Week 1: Multiple Agent Dynamics I

Building blocks. Computational approaches and estimation.


Module 2 - Week 2: Multiple Agent Dynamics II

Applications. Solutions to the curse of dimensionality.

Module 3 - Week 1: Topics in Multi-unit Auctions and Electricity Markets


Module 3 - Week 2: Topics in Multi-unit Auctions and Electricity Markets

Applications and extensions.


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Module 4 - Week 1: Regulation I

Rate-of-return regulation. Theory and applications.


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Module 4 - Week 2: Regulation II

Rate-of-return regulation. Theory and applications.

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Module 5: Dynamics and electricity markets

Modeling short- and long-run dynamics in electricity markets.

Module 6: Pass-through

Theory and applications. Structural and reduced-form approaches.