ECON 621: Markets and Models
University of Wisconsin-Madison
Spring 2021 · 3 credits · remote, synchronous instruction
https://canvas.wisc.edu/courses/245050

Like everything these days, this syllabus is subject to change. Last updated: 11 Jan 2021

Course Description: An investigation into the various ways that markets determine the allocation of scarce resources: via a single market-clearing price, waiting in line or other forms of rationing, search, a centralized matching algorithm, an auction, or a contest. We will examine real-world examples of each type of market, and introduce and solve a formal theoretical model of each to see what insights it leads to.

Instructor: Daniel Quint, Associate Professor, Economics
dquint@ssc.wisc.edu
Office hours: Online, Mondays 3-4 and Thursdays 2:30-3:30 p.m.
(OH will be on Zoom, and may change as the semester goes on. Link to join is on Canvas.)

Lectures: Tuesdays and Thursdays, 1-2:15 p.m., online (on Zoom). Lectures will be recorded for later viewing/re-viewing. Link to join lectures is on Canvas.

Prerequisites: (Econ 301 or 311) and (Math 217, 221, or 275), or graduate/professional standing. This class is intended for students who are comfortable using calculus.

Attributes: Advanced level; Social Science breadth; LAS credit for L&S; Grad attribute.

Credits: 3. This course has two 75-minute lectures per week. Students are expected to work at least 6 hours per week outside of class to complete assignments and learn the relevant material.

Learning Outcomes: After taking this class, successful students will be able to…

- explain general principles of why some markets work well (and others do not), and demonstrate why the precise details matter

- discuss details of how particular real-world markets operate

- construct theoretical economic models to match key features of real-world markets, and apply mathematical tools to analyze these models

Exams: This class will have two midterms and a final exam. Midterms will be during regular class time, most likely Thu March 4 and Thu April 8. The final exam is Wed May 5, from 2:45 to 4:45 p.m. There will also be an evening exam option for students taking the class remotely from a timezone where the exams would be in the middle of the night locally.

Exams will be online and open book. I will not be using an automated proctoring system, because I find them creepy, invasive, insulting, and stress-inducing and I’m not convinced they work well. For reasons of morality, personal integrity, fairness and decency, I expect you not to cheat; as I explain below, consequences will be severe if you do.

Please contact me as early as possible (ideally in the first two weeks of the semester) if you anticipate a conflict with an exam, are in a timezone very different from Madison’s, or if you are a McBurney student who will be requesting exam accommodations.
Grading

Grades will be determined in one of the following three ways, whichever gives you the highest average:

- 50% homework (best 7)
- 15% midterm 1
- 15% midterm 2
- 20% final exam

or

- 50% homework (best 7)
- 20% higher midterm score
- 30% final exam

or

- 50% homework (all 8)
- 25% midterm 1
- 25% midterm 2

So with one exception (explained below), if you miss or do poorly on any exam, you can drop it and shift the weight to the other two. This also means if you're happy with both midterm scores and did all 8 homeworks, the final exam is optional; if you count the final exam, you can drop your lowest homework score.

Since any exam score can be dropped, I will not give makeup exams for the midterms, and will only give a makeup final exam under extraordinary circumstances.

Homework

There will be 8 homework assignments, typically due at midnight on Monday nights. Under the first two grading rules, your lowest homework score gets dropped, so your best 7 homework scores make up half of your final grade; if you don’t take (or don’t count) the final exam, all 8 homework scores count.

On most homework assignments, I encourage to work together, but I require that each person write up his or her own answers separately. That is, you should feel free to discuss the questions and answers, work on them together, and come to a consensus on what the right answers are; but then each person should write up their answers individually, rather than passing around one set of answers for everyone to copy. Please do not meet in person if it is not safe to do so. If an assignment is meant to be done on your own, I’ll make that clear. It should go without saying that joint work of any sort is not allowed on exams.

Exams

Midterm exams (most likely on Thursday March 4 and Thursday April 8) will be given during the regular class meeting time. The final exam is Wednesday May 5 from 2:45 to 4:45 p.m. I’ll offer an evening option on exams for students taking the class remotely from places where the exams would be in the middle of the night. Please contact me at the start of the semester if this is the case.

Exams will be online and open book. At the start of the exam time, you’ll download the questions as a PDF file; at the end of the exam time, you’ll upload your answers, in whatever format you prefer. (Scans or photos of handwritten work are fine as long as they’re legible; typed work is fine too.) Please confirm that your upload succeeded, and double-check that you didn’t miss any pages!

I know that having exams online makes it easier to cheat in certain ways. As noted above, I am choosing not to use Honorlock or another online proctoring service because I find them insulting, invasive, and creepy. I expect you not to cheat, for reasons of morality, personal integrity, and fairness toward your classmates.

Even without online proctoring, I believe that if you cheat, there is a significant probability I will catch you. If I find that you cheated on an exam – by copying another student’s answers, by allowing another student to copy yours, by posting the questions in an online help forum, or in any other way – you will get a 0 on the exam, which cannot be dropped and must count in the calculation of your exam score.

I will be completely inflexible about this – if you cheat, I will see that as someone taking advantage of course policies designed to make a difficult semester less annoying and stressful for everyone, and I’ll take it personally. On the other hand, as noted above, if you try your best and do poorly on an exam, you can drop it. So please, don’t cheat – both our semesters will be much more annoying if you.
# Course Overview

At a high level, the class will be organized as follows.

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Topic</th>
<th>Homework</th>
<th>Exams</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>1/26</td>
<td>Overview of the semester</td>
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<tr>
<td><strong>Unit 1: Walrasian Markets</strong></td>
<td>1/28</td>
<td>Why economists typically expect markets to “work” in theory, but why even the markets that seem to fit the “simple model” well get complicated in practice. <em>Examples: stock markets; day-ahead electricity markets in Texas</em></td>
<td>HW1 due Mon 2/8</td>
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<tr>
<td><strong>Unit 2: Rationing and Queuing</strong></td>
<td>2/11</td>
<td>What happens when we use something other than price to allocate a scarce resource. <em>Examples: “Krzyszewskiville,” concert tickets, why economists like Uber more than taxis</em></td>
<td>HW2 due Mon 2/22</td>
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<td>2/16</td>
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<td>Midterm 1 Thu March 4</td>
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<td><strong>Unit 3: Matching and Search</strong></td>
<td>2/25</td>
<td>Who gets what job, house, or partner when people have to find each other in order to trade. <em>Examples: labor markets, real estate, online dating</em></td>
<td>HW3 due Mon 3/1</td>
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<td><strong>Unit 4: Centralized Matching Markets</strong></td>
<td>3/11</td>
<td>How centralized clearinghouses facilitate trade in “matching markets.” <em>Examples: how doctors match to residencies; how public schools assign students; how kidney patients find compatible donors</em></td>
<td>HW4 due Mon 3/15</td>
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<td>3/30</td>
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<td>Midterm 2 Thu April 8</td>
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<td><strong>Unit 5: Auctions</strong></td>
<td>4/1</td>
<td>What theory says about auctions for single goods; how interesting real-world markets are often far beyond the simple model; and what theory has to say about the “harder” cases. <em>Examples: “sponsored search” ad auctions; wireless spectrum auctions</em></td>
<td>HW5 due Mon 3/29</td>
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<td>HW6 due Mon 4/5</td>
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<td><strong>Unit 6: Contests</strong></td>
<td>4/27</td>
<td>What effects a winner-take-all contest has on allocation and investment. <em>Examples: R&amp;D/patent races, lobbying, elections, Department of Defense procurement</em></td>
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<tr>
<td><strong>Wrap-up</strong></td>
<td>4/29</td>
<td>Big-picture lessons and takeaways</td>
<td>Final Exam Wed May 5</td>
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**Readings**

I ask that you have access to the following book:


This is not a “textbook” for the class in the traditional sense, but we’ll cover several parts of it, and it’s a fun $15 book – you should get it.

Other readings will be from a variety of sources, and will be posted on Canvas. The syllabus lists a lot of sources – **I do not expect you to read everything listed below.** Some of these papers will be explored thoroughly in class; some I’ll touch on briefly; and some are there so you can “dig deeper” when you find a topic that particularly interests you, which I hope you will. Arrows (➤) indicate the most important readings.

The reading list also indicates a few **bonus theory results** meant as added enrichment for those inclined in that direction. (I hope to post video of the proofs of these results as optional bonus material.)

My lecture notes will be posted after each class, along with a recording of the lecture.

**Background material**

- Introduction to Roth, *Who Gets What – And Why*

(Useful background material, mostly from the “market design” literature. If you want to read one thing, I’d suggest the Glaeser book review – it does a nice job of explaining market design while also placing it within the broader context of economics.)

**Unit 1: Walrasian Markets**

*The First Welfare Theorem (Jan 28)*

- My lecture notes on the First Welfare Theorem

*The Coase Theorem (Feb 2)*

- Coase’s Nobel Prize lecture [link](https://www.nber.org/papers/w3641)
Stock Markets and High-Frequency Trading (Feb 4)

- Roth, *Who Gets What – And Why*, ch. 5

Electricity Auctions (Feb 9)


Unit 2: Rationing and Queuing


Unit 3: Matching Markets and Search

- **Bonus theory result**: the Gittins Index, or optimal search rule:

Unit 4: Centralized Matching Markets

- Roth, *Who Gets What – And Why*, ch. 4 (unraveling), 8 (NRMP), 9 (school choice), 3 (kidney exchange)
• Mohammad Akbarpour, Farshad Fatemi, and Negar Matooarian, “The Iranian Market for Kidneys,” working paper (2019) if you can find it?
• **Bonus theory result:** strategy-proofness of the DAA for the “proposing side”:

**Unit 5: Auctions**

• Thomas Hazlett (2017), “FCC “Incentive Auction” marks progress and pitfalls towards freeing wireless spectrum,” Brookings Institute (link)
• **Bonus theory result:** the revenue-maximizing auction:
• **Bonus theory result:** adding a bidder is worth more than choosing the optimal auction:

**Unit 6: All-Pay Auctions and Contests**

• **Bonus theory result:** expected payoffs in a full-information all-pay contest:
  - Ron Siegel (2009), “All-Pay Contests,” *Econometrica* 77.1
Additional sources if you want to go even deeper into some of these topics

Continuous Limit Order Books and High-Frequency Trading

Queuing and Rationing
- Juan Castillo, Daniel Knoepfle and Glen Weyl (2018), “Surge Pricing Solves the Wild Goose Chase,” working paper (link)

Search (Theory and Application)
- More on the “Gittins Index”
School Choice


Course Match


Kidney Exchange


Auctions and Related Complications


Internet ad auctions


Radio Spectrum Auctions


Contests

Learning in the Time of COVID

I URGE YOU TO TAKE BOTH YOUR PHYSICAL AND MENTAL HEALTH VERY SERIOUSLY THIS SEMESTER! Information on mental health resources is below. Here are some sources of reliable information on COVID-19:

- Public Health Madison & Dane County: https://www.publichealthmdc.com/
- An interdisciplinary, all-female team of smart researchers and clinicians (including here at UW) in epidemiology, nursing, mental health, and other areas who call themselves the “nerdy girls” on social media: Dear Pandemic on Facebook on Twitter and on Instagram

Mental Health Resources

As a student you may experience a range of issues that can cause barriers to learning. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, or loss of motivation. University Health Services can help with these or other issues you may experience. UHS has a variety of free, confidential mental health services available for students:

- UHS Mental Health page
- UHS Support Groups
- Access Appointment process (phone call to connect with appropriate resources)
- Virtual Wellness Resources
- SilverCloud: online, self-guided mental health resource available 24/7 (no referral needed)
- 24 hour crisis services: 608-265-5600

IF YOU FEEL OVERWHELMED OR DEPRESSED, YOU ARE NOT ALONE AND THERE IS NO SHAME IN FEELING THIS WAY. Please know that help is always available.

Accommodations for Students with Disabilities

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student’s educational record, is confidential and protected under FERPA.

Institutional Statement on Diversity

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background - people who as students, faculty, and staff serve Wisconsin and the world.
**Violence Prevention Resources**

Experiences of sexual assault, sexual harassment, dating violence, domestic violence, and stalking affect many students on this campus and can create barriers to learning. UW-Madison is committed to fostering a safe, productive learning environment and offers a variety of resources and options for students impacted by violence. Learn about the free, confidential services available on campus and in the community by visiting [www.uhs.wisc.edu/assault](http://www.uhs.wisc.edu/assault).

**Misconduct Statement**

Academic Integrity is critical to maintaining fair and knowledge based learning at UW Madison. Academic dishonesty is a serious violation: it undermines the bonds of trust and honesty between members of our academic community, degrades the value of your degree and defrauds those who may eventually depend upon your knowledge and integrity.

Examples of academic misconduct include, but are not limited to: cheating on an examination (copying from another student's paper, referring to materials on the exam other than those explicitly permitted, continuing to work on an exam after the time has expired, turning in an exam for regrading after making changes to the exam), copying the homework of someone else, submitting for credit work done by someone else, stealing examinations or course materials, tampering with the grade records or with another student's work, or knowingly and intentionally assisting another student in any of the above. Students are reminded that online sources, including anonymous or unattributed ones like Wikipedia, still need to be cited like any other source; and copying from any source without attribution is considered plagiarism.

The Department of Economics will deal with these offenses harshly following [UWS14 procedures](https://www.wisc.edu):

1. The penalty for misconduct in most cases will be removal from the course and a failing grade,
2. The department will inform the Dean of Students as required and additional sanctions may be applied.
3. The department will keep an internal record of misconduct incidents. This information will be made available to teaching faculty writing recommendation letters and to admission offices of the School of Business and Engineering.

If you think you see incidents of misconduct, you should tell your instructor about them, in which case they will take appropriate action and protect your identity. You can also choose to contact our department administrator, Tammy Herbst-Koel (therbst@wisc.edu), and your identity will be kept confidential.

For more information, refer to [https://conduct.students.wisc.edu/academic-misconduct/](https://conduct.students.wisc.edu/academic-misconduct/)

**Grievance Procedure**

The Department of Economics has developed a grievance procedure through which you may register comments or complaints about a course, an instructor, or a teaching assistant. The Department continues to provide a course evaluation each semester in every class. If you wish to make anonymous complaints to an instructor or teaching assistant, the appropriate vehicle is the course evaluation. If you have a disagreement with an instructor or a teaching assistant, we strongly encourage you to try to resolve the dispute with him or her directly. The grievance procedure is designed for situations where neither of these channels is appropriate.

If you wish to file a grievance, you should go to room 7238 Social Science and request a Course Comment Sheet, or contact our department administrator, Tammy Herbst-Koel (therbst@wisc.edu), to request one remotely. When completing the comment sheet, you will need to provide a detailed statement that describes what aspects of the course you find unsatisfactory. You will need to sign the sheet and provide your student identification number, your address, and a phone where you can be reached. The Department plans to investigate comments fully and will respond in writing to complaints.

Your name, address, phone number, and student ID number will not be revealed to the instructor or teaching assistant involved and will be treated as confidential. The Department needs this information, because it may become necessary for a commenting student to have a meeting with the department chair or a nominee to gather additional information. A name and address are necessary for providing a written response.