Course Description
This is an advanced course in microeconomic theory. Topics covered include: (i) consumer and producer theory; (ii) theories of choice under uncertainty, including measures and attitudes towards risk; (iii) applications to insurance and portfolio choice; (iv) game theory; and (v) applications to bargaining and auctions.

Instructor
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Texts
- Osborne, *Introduction to Game Theory*, 2012

Prerequisites
MATH121. (MATH215, and ECON360 are desirable.) This course is intended as part of the Mathematical Economics concentration and is most suitable for students who enjoy microeconomic theory and thinking analytically.

Assessment
Student evaluation will be based on weekly problem sets (20%), a mid-term exam (30%), a final exam (30%), and class participation (20%).

Problem sets shall be submitted via Moodle, typically on a Friday. Late problem sets will incur a penalty of 10% if submitted within 2 days of deadline, and 20% if submitted any later. Problem sets should be typeset in Latex. Solutions will be posted on Moodle the following week. The take-home midterm exam will be held during the week beginning October 19, and the final exam will be during finals week.

Format
This course will be taught using a ‘flipped classroom’ format. Students will be responsible for watching approximately 2 hours worth of lecture recordings in their own time. Additionally, students will attend a
weekly one-hour small-group problem-solving session. Students are expected to have appropriately engaged with the lecture recordings prior to attending problem-solving sessions. Students can access lecture recordings, slides and course notes on Moodle.

**Economics Question Center**

Students are also encouraged to make use of the weekly Economics Question Center to ask questions and work collaboratively with peers. The EQC will be held on Tuesday and Thursday evenings 7:30pm-9:30pm (ET) and Thursdays 10am-12pm (ET), and will be staffed by a mix of faculty and teaching assistants. I will typically be available on Tuesday evenings and Thursday mornings. Due to physical distancing requirements, the EQC will be conducted via Google Meets, and students can collaborate using Google Jamboards. See Moodle for more details.

There is also a dedicated Google Chat room for this course, which you may use to interact with me and with your peers.

**Course Outline**

1. Consumer Theory (3 weeks)
   a. Preferences
   b. Utility Maximization & Expenditure Minimization
   c. Welfare
   d. General Equilibrium

2. Theory of Choice Under Uncertainty (3 weeks)
   a. Lotteries and Expected Utility
   b. Risk (Risk Measures and Risk Preferences)
   c. Violations of Expected Utility

3. Applications in Markets (3 weeks)
   a. Insurance Markets
   b. Asset Markets
   c. Optimal Risk Sharing
   d. Capital Asset Pricing Model

4. Game Theory (4 weeks)
   a. Equilibrium concepts: Nash (existence of), Subgame perfection
   b. Bargaining
   c. Auction Theory
   d. Games of Incomplete Information
<table>
<thead>
<tr>
<th>Week</th>
<th>Beginning (Monday)</th>
<th>Lecture Recordings</th>
<th>Lecture Notes</th>
<th>Assessment (due Friday)</th>
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</table>
| 1    | 9/7               | 1. Preferences  
2. Utility Maximization | 1.1, 1.2        | Problem Set 1  |
| 2    | 9/14              | 3. Expenditure Minimization  
4. Welfare | 1.3, 1.4, 1.5, 1.6 | Problem Set 2  |
| 3    | 9/21              | 5. Ramsey Taxation  
6. General Equilibrium | 1.7  
2.1, 2.2 | Problem Set 3  |
| 4    | 9/28              | 7. Expected Utility  
8. State Space | 3.1, 3.2  
3.3 | Problem Set 4  |
| 5    | 10/5              | 9. Risk Preferences  
10. Interpersonal Risk. | 4.1  
4.2 | Problem Set 5  |
| 6    | 10/12             | 11. Risk Comparisons  
12. Non Expected Utility | 4.3  
3.4, 3.5, 3.6 | Problem Set 6  |
| 7    | 10/19             | 13. Applications  
14. Insurance |                       | Problem Set 7  |
| 8    | 10/26             | 15. Markowitz Portfolios  
16. Arrow Debreu Securities |                       | Problem Set 8  |
| 9    | 11/2              | 17. Risk Sharing  
18. Asset Pricing |                       | Midterm Exam  |
20. Subgame Perfection |                       | Problem Set 9  |
22. Axiomatic Bargaining  
23. Reputational Bargaining |                       | Problem Set 10 |
| 12   | 11/30             | 24. Auctions  
25. Interdependent Auctions |                       | Problem Set 11 |
| 13   | 12/6              | 26. Contract Theory |                       | Problem Set 12 |