Game Theory II: Advanced Topics Syllabus

John W. Patty

ICPSR Summer Program Session II

This course covers advanced noncooperative game theory with an emphasis on its use in political science. In order to get the most out of the material, you should have taken Game Theory I (offered in ICPSR Summer Session I), or its equivalent, prior to taking this class.

**Course Text.** The course text is *Game Theory: An Introduction*, by Steven Tadelis. It should be available online.

**Course TA.** Byung Koo Kim. Email: kimbk@umich.edu.

**Contact Information.** My email is jwpatty@gmail.com.

**Course Website.** The course website is located here[^1] and the password is confetti.

**Course Meetings.** The class will be held 10am-Noon, July 23-August 15th (no class on July 22 or August 16th).

**Course Grading.** If you wish to take the course for a grade, you must notify me by the end of the first week. If you do not notify me by this time, you will not receive a grade. We will grade your homework in any event for your feedback but, for obvious reasons, we will prioritize feedback for those who choose to take the course for a grade. For those who wish to be assigned a grade, the course grade will be based on the following criteria:

1. **Two Problem Sets.** Combined, these are worth 40% of the final course grade. Each assignment is due at the beginning of the class for which it is listed below. The assignments should be turned in electronically (there’s a link on the course website) by the beginning of class on the date listed below in the course schedule. Late assignments will be penalized by 25 points (out of 100) for each day late.

2. **Midterm Exam.** The midterm exam is in-class and worth 20% of the final course grade.

3. **Final Exam.** The final exam is comprehensive and take-home. It is worth 40% of the final course grade and due at 10am on the last day of class.

The course is graded on the following scale:

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥94</td>
<td>A</td>
</tr>
<tr>
<td>≥83</td>
<td>B</td>
</tr>
<tr>
<td>≥73</td>
<td>C</td>
</tr>
<tr>
<td>≥63</td>
<td>D</td>
</tr>
<tr>
<td>≥90</td>
<td>A-</td>
</tr>
<tr>
<td>≥80</td>
<td>B-</td>
</tr>
<tr>
<td>≥70</td>
<td>C-</td>
</tr>
<tr>
<td>≥60</td>
<td>D-</td>
</tr>
<tr>
<td>≥87</td>
<td>B+</td>
</tr>
<tr>
<td>≥77</td>
<td>C+</td>
</tr>
<tr>
<td>≥67</td>
<td>D+</td>
</tr>
<tr>
<td>&lt;60</td>
<td>E</td>
</tr>
</tbody>
</table>

I do not round grades so, for example, a final grade of 93.9 is an “A-.”

[^1]: The url is [http://www.johnwpatty.net/advanced-game-theory-course-website/](http://www.johnwpatty.net/advanced-game-theory-course-website/)
Teaching Philosophy. I hope you will meet with me during the session, especially if you have questions about the course material. I welcome questions during class: if you have a question or comment, please interrupt me!

Workshops. On the first and third Fridays, I will lead a workshop in class in which we “build a model from scratch.” The goal of these sessions is to show you a bit of how game theory models are developed for the purposes of analyzing real-world problems. I will discuss this process more on the first day of the course. Suggest your own research interests as possible topics!

Various Policies.

- You may work together on the problem sets, but you should each prepare your answers separately.
- The homework assignments and the take-home exam should be typed (preferably prepared in LaTeX) and submitted electronically as a pdf (there’s a link on the course website). We will not grade handwritten assignments. If you need/want to draw a figure, I recommend Inkscape, a free vector graphics program.
- The problem sets are “open book and open notes.”
- The midterm is “closed book and closed notes.” You may use a calculator.
- You are to consult only with Professor Patty and the TA regarding the final exam.
- Though it is take-home, the final exam is “closed book and closed notes”: you should consult no materials while taking it.

Class Schedule. The class schedule is as follows:

1. (July 22) **No Class on Morning of 1st Day.**
2. (July 23) Introduction & Review, Extensive Form Games & Subgame Perfect Nash Equilibrium
   - Tadelis, Chapters 7 & 8
3. (July 24) Multistage & Repeated Games
   - Tadelis, Chapters 9 & 10
4. (July 25) Bargaining I
   - Tadelis, Chapter 11
5. (July 26) **Workshop**
   - **Deadline for Notifying that You Wish to Take the Course for a Grade.**
   - Homework 1 Due.
6. (July 29) Bargaining II
7. (July 30) Static Bayesian Games I
   - Tadelis, Chapter 12
8. (July 31) Static Bayesian Games II
9. (Aug 1) Perfect Bayesian Equilibrium & Sequential Equilibrium
   - Tadelis, Chapter 15

10. (Aug 2) In-Class Midterm Exam

11. (Aug 5) Signaling Games I
    - Tadelis, Chapter 16

12. (Aug 6) Signaling Games II

13. (Aug 7) Reputation
    - Tadelis, Chapter 17

14. (Aug 8) Cheap Talk Signaling
    - Tadelis, Chapter 18

15. (Aug 9) Workshop
    - Homework 2 Due.

16. (Aug 12) Mechanism Design
    - Tadelis, Chapters 13 & 14

17. (Aug 13) Principal-Agent Theory: Moral Hazard & Adverse Selection

18. (Aug 14) Global Games

19. (Aug 15) Bayesian Persuasion

    - Take-Home Exam Due at 10am.