ECONS 424 – STRATEGY AND GAME THEORY

SPRING 2020 – JANUARY 13TH TO MAY 8TH

Instructor: Joseph Navelski
Number of credits: 3 credits.
Lectures: Hulbert Hall 27, Monday, Wednesday, Friday, 11:10a.m.-noon.
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Office hours: Monday and Wednesday 3:10-4:00p.m. and by appointment.

Course Rationale:

This course analyzes the strategic behavior of firms, consumers, but also political parties and individuals in their everyday interaction. The focus of the course will mainly be applied, although some basic general principles will be discussed in order to address these strategic situations in a more rigorous manner.
Different examples, ranging from business and industrial organization to politics, international trade and biology, will be used, showing the importance and usefulness of the concepts discussed in class.

Course Objectives and Learning Outcomes:

The main goal of the course is to make you apply the tools of game theory in order to examine interactive decision problems, i.e., situations whereby every agent's actions have payoff consequences on other agents. In particular, by the end of this course you will be able to:

- Construct the structure of interactive decision problems,
- Analyze which are the available strategies for each player, and
- What is the amount of information known by a player before she makes her move.
- Predict and describe how a certain game is going to be played by the players involved (i.e., their equilibrium behavior), and how firms or institutions behave when facing an strategic interaction.
- Model economics and business topics covered in other courses using the formal tools that game theory provides.

As a by-product, you will learn to view social interactions as strategic games, to use game theoretic concepts to predict behavior in these interactions and to conceive of ways in which altering the game affects social outcomes.

WSU Learning Goals:

This course will contribute to the following WSU learning goals: critical and creative thinking, and quantitative reasoning.

Prerequisites:

Intermediate Microeconomics (EconS 301) is required. Some high-school algebra is also expected.

Required Text:

- *Games, Strategies and Decision Making.* Joseph Harrington Jr. Worth Publishers. (Second edition) 2014. You can find it at the Washington State University bookstore (Bookie).
- *Strategy and Game Theory: Practice Exercises with Answers.* Felix Munoz-Garcia and Daniel Toro-Gonzalez. Springer Verlag, 2017. (Detailed answer keys to standard game theory exercises in game theory. You can find it at the Bookie.)

Recommended Reading:

1. What about some non-technical reading (let's start with some fun!):
   - *The Art of Strategy.* Avinash Dixit and Barry J. Nalebuff. Norton Publishers. 2008.
2. If you are mostly interested in the applications of game theory tools:
   - *Games of Strategy.* Avinash Dixit, Susan Skeath and David H. Reiley Jr. Norton Publishers. 2009. (Very verbal).
   - *An Introduction to Game Theory*. Martin Osborne. Oxford University Press. 2004. (Combines verbal explanations with some rigor).
   - *Strategy. An Introduction to Game Theory.* Joel Watson. Norton Publishing. 2nd edition. 2008.
   - *Game Theory for Applied Economists.* Robert Gibbons. Princeton University Press. 1992. (Close in length to Watson, so it is short!)
   - *Game Theory: Interactive Strategies in Economics and Management.* Aviad Heifetz. Cambridge University Press. 2012.
   - *Game Theory: An Introduction.* Steven Tadelis. Princeton University Press. 2013. (Most upper undergraduate, so highly recommended for most of you).
   - *Games and Decision Making.* Charalambos D. Aliprantis and Subir K. Chakrabarti. Oxford University Press. 2011 (second edition).
   - *Strategies and Games. Theory and Practice.* Prajit K. Dutta. MIT Press. 1999.
3. If your game theory background is relatively strong, or if you are especially interested in theoretical analysis:
   - *Game Theory*. Michael Maschler, Eilon Solan, and Shmuel Zamir, Cambridge University Press, 2013.
   - *Game Theory*, Drew Fudenberg and Jean Tirole. MIT Press. 1991.
   - *A Course on Game Theory*. Ariel Rubinstein and Martin Osborne. MIT Press. 1994.
   - *Economics and the Theory of Games*. Fernando Vega-Redondo. Cambridge University Press. 2003.
   - *Behavioral Game Theory, Experiments in Strategic Interaction*. Colin F. Camerer. Princeton University Press. 2003.
4. Applications of Game Theory to Political Science and Environmental Economics:
   - *Special Interest Politics*. Gene M. Grossman and Elhanan Helpman. MIT Press. 2002.
   - *Game Theory and the Environment*. Nick Hanley and Henk Folmer. Edward Elgar Publishers. 1999.
   - *Environmental Policy and Market Structure*. C. Carraro (Editor), Y. Katsoulacos (Editor), A. Xepapadeas (Editor). Springer. 1996.

Lectures:

Lectures will be held in Hulbert 27 (ground floor), on Mondays, Wednesdays and Fridays, 11:10–12:00p.m.

Attendance Policy:

Students are expected to attend class and participate in class activities. To be engaged is a key for students' success in the class.

Class materials:

All class materials (handouts, additional readings, homework assignments, answer keys, etc.) will be posted on the course Blackboard website and additional study materials can be found on at: https://felixmunozgarcia.com/econs-424/. Dr. Felix Munoz-Garcia is an instructor that has previously taught this course, and his website is full of resources that parallel is course's content.

Grading:

Your grade for the course will be based on:

- Quizzes (5%),
- Problem sets (35%),
- Two midterms (Midterm #1 in class, Midterm #2 take-home) (20% each), and
- Final exam (20%).

Exam dates:

Midterm #1: Friday, February 28th, in class.

Midterm #2 (Take-home exam): It will be posted on the course website on Friday, April 10th, and it will be due in class on Monday, April 13th.

Final Exam: TBD, but this will be an in-class exam.

Make-up exams will only be given if you have a note from a doctor indicating that you were unable to take the exam at the scheduled time.

DESCRIPTION OF COURSE REQUIREMENTS

Quizzes:

Short quizzes will be given at the beginning of some classes (you can expect about 5 quizzes), except for the first few weeks. I will be announcing quizzes a few days in advance.

Homework:

Homework assignments will be posted on the course website. Make sure you give yourself enough time to complete the problem sets. You are encouraged to work in groups, although an individual homework assignment has to be assigned per student. Working in groups has proven to be a very successful learning technique for previous students of this course.

Additional practice problems can be provided if required.

Grading scale:

A	91-100	C-	55-59
A-	85-90	D+	50-54
B+	80-84	D	45-49
B	75-79	D-	40-44
B-	70-74	F	0-39
C+	65-69		
C	60-64		

~ Note: Grades will not be curved. ~

Course Schedule:

The course schedule is tentative. Legend for the textbooks in the recommended readings section: Watson (W), Harrington (H), Osborne (O) and Gibbons (G). The legend for the textbooks on the optional readings is Heifetz (HE), Tadelis (T), Aliprantis and Chakrabarti (AC), and Dutta (D).

- As discussed in class, you are encouraged to read at least one of the recommended readings. In addition, if you are either a Masters student or considering a graduate program in the future, I strongly recommend you to read at least one of the optional readings.

1. **Week 1** (January 13th –17th):
    a. Introduction and Dominance solvable games.
    b. *Recommended readings:* H: 1-3, W: 2-7.
    c. *Optional readings (Masters):* G: 1.1.A-1.1.B, D: 1-4, HE: 1-5, T: 1-4, AC: 1-2.3.
2. **Week 2** (January 20th – 24th):
    a. Monday, January 20th is Martin Luther King Jr. Day (Holiday)
    b. Pure strategy Nash equilibrium and applications-I.
    c. *Recommended readings:* H: 4-6, O: 2-3.
    d. *Optional readings (Masters):* G:1.1.C, D: 5-6, HE: 6-7, T: 5, AC: 2.6
3. **Week 3** (January 27th – 31st):
    a. Pure strategy Nash equilibrium and applications-II
    b. *Recommended readings:* H: 4-6, O: 2-3.
    c. *Optional readings (Masters):* G: 1.2, AC: 2.8, D: 7, 9, HE: 8-9.
4. **Week 4** (February 3rd – 7th):
    a. Mixed strategy Nash equilibrium and applications.
    b. *Recommended readings:* H: 7, W: 11, O: 4, G: 1.3-1.4, D: 8
    c. *Optional readings (Masters):* HE: 10-11, T: 6, AC: 2.4
    d. *Optional readings (Ph.D.):* FT: 1.3.1, M: 5, V: 1.5
5. **Week 5** (February 10th – 14th):
    a. Zero-sum games.
    b. *Recommended readings:* W: 12, H: section 7.6.
    c. *Optional readings (Masters):* O: 11, D: 10, HE: 12, AC: 2.5, 9.2

6. **Week 6** (February 17th – 21st):
    a. Extensive form games and subgame perfect equilibrium.
    b. *Recommended readings:* H: 8-9, W: 14-15.
    c. *Optional readings:* O: 5, G: 2.1.A-2.1.B, D: 11, 13, HE: 18-19, T: 7-8, AC: 3-4.2
7. **Week 7** (February 24th – 28th):
    a. Monday, February 18th is Presidents Day (Holiday).
    b. Applications of extensive form games.
    c. *Recommended readings:* W: 16, 18, 19.
    d. *Optional readings:* O: 6-7, G: 2.1.C-2.1.D, D: 12, HE: 20-21, AC: 4.3-4.4.
    e. *Midterm exam #1:* Friday, February 28th, in class.
8. **Week 8** (March 2nd – 6th):
    a. Infinitely repeated games and its applications-I.
    b. *Recommended readings:* W: 22-23.
    c. *Optional readings:* G: 2.3.A-2.3.B, D: 15-16, HE: 23, T: 10, AC: 6.1-6.3.
9. **Week 9** (March 9th – 13th):
    a. Infinitely repeated games and its applications-II.
    b. *Recommended readings:* H: 13-14.
    c. *Optional readings:* O: 14-15, G: 2.3.C-2.3.D, D: 17, HE: 24, AC: 6.4-6.5.
10. **Week 10** (March 16th –20th):
    a. Spring break.
11. **Week 11** (March 23rd –27th):
    a. Simultaneous games under incomplete information and its applications - I.
    b. *Recommended readings:* W: 24, 26-28.
    c. *Optional readings (Masters):* G: 3.1, D: 19-21, T: 12, AC: 8.1-8.6.
12. **Week 12** (March 30th – April 3rd):
    a. Simultaneous games under incomplete information and its applications - II.
    b. *Recommended readings:* W: 24, H: 10.
    c. *Optional readings (Masters):* T: 13-14, O: 9, G: 3.2-3.4, D: 22-23.
13. **Week 13** (April 6th – 10th):
    a. Signaling games-I.
    b. *Recommended readings:* W: 29.
    c. *Optional readings (Masters):* T: 16, G: 4.1-4.2.B, D: 24.
    d. *Midterm exam #2 (Take-home exam)*. It will be posted on the course website on Friday, April 10th, and it will be due in class on Monday, April 13th
14. **Week 14** (April 13th – 17th):
    a. Signaling games-II.
    b. *Recommended readings:* W: 29, H: 11.
    c. *Optional readings (Masters):* T: 17, AC: 8.7, O: 10, G: 4.2.C-4.2.D.
15. **Week 15** (April 20th – 24th):
    a. Cheap talk games.
    b. *Recommended readings:* H: 12.
    c. *Optional readings (Masters):* T: 18, O: 10.

16. **Week 16** (April 27th – May 1st):
    a. Equilibrium refinements: The "Intuitive Criterion" (Handouts).
17. **Week 17** (May 4th – 8th):
    a. Final Exams' week.

Disability Resource Accommodation:

Reasonable accommodations are available for students who have a documented disability. Please notify the instructor the first week of class of any accommodations needed for the course. Late notification may cause the requested accommodations to not be available. All accommodations must be approved through the Disability Resource Center (DRC) in Administration Annex 205, 335-1566, http://www.drc.wsu.edu/

Academic Honesty:

WAC 504-25-015. Academic dishonesty, such as cheating, plagiarism, fabrication, and fraud, is prohibited. See http://www.conduct.wsu.edu/default.asp?PageID=343 for more information and specific definitions of academic dishonesty.

As an institution of higher education, Washington State University is committed to principles of truth and academic honesty. All members of the University community share the responsibility for maintaining and supporting these principles. When a student enrolls in Washington State University, the student assumes an obligation to pursue academic endeavors in a manner consistent with the standards of academic integrity adopted by the University. To maintain the academic integrity of the community, the University cannot tolerate acts of academic dishonesty including any forms of cheating, plagiarism, or fabrication. Washington State University reserves the right and the power to discipline or to exclude students who engage in academic dishonesty. To that end, the University has established the following rules defining prohibited academic dishonesty and the process followed when such behavior is alleged. These rules incorporate Washington State University's Academic Integrity Policy, the University-wide document establishing policies and procedures to foster academic integrity. This policy is applicable to undergraduate and graduate students alike, as it pertains to dishonesty in course work and related academic pursuits. In cases of dishonesty in research and original scholarship, the University's Policy and Procedural Guidelines for Misconduct in Research and Scholarship may take precedence over the policies and procedures contained herein.

Academic dishonesty includes cheating, plagiarism, and fabrication in the process of completing academic work. These standards should be interpreted by students as general notice of prohibited conduct. They should be read broadly, and are not designed to define misconduct in exhaustive forms.

Campus Safety Plan:

Can be found at http://safetyplan.wsu.edu and http://oem.wsu.edu/emergencies, contains a comprehensive listing of university policies, statistics and information related to campus safety, emergency management and the health and welfare of the campus community.

Disclaimer: This syllabus is subject to change to facilitate instructional and/or student needs.