

ECONS 424 – STRATEGY AND GAME THEORY

SPRING 2021 – JANUARY 19TH TO MAY 7TH

Instructor: Ana Espinola-Arredondo
Number of credits: 3 credits.

TA: Grace Grimm grace.grimm@wsu.edu

TA Office hours: Tuesdays, 3:00-4:00 pm.,
Zoom or by appointment.

Lectures: Zoom
Monday, Wednesday, Friday,
11:10a.m.-noon.

Office: 101B Hulbert Hall

Phone: 509-335-8494

e-mail: anaespinola@wsu.edu

Office hours: Fridays 9:00-10:00a.m. 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, 2019. (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 via Zoom, 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 website: <https://anaespinoaarredondo.com/econs-424-game-theory/>

Grading:

Your grade for the course will be based on:

- Problem sets (40%),
- Two midterms (Midterm #1 in class, Midterm #2 take-home) (20% each), and
- Final exam (20%).

Exam dates:

Midterm #1: Friday, March 5th, in class (Zoom).

Midterm #2 (Take-home exam): It will be posted on the course website on Friday, April 9th at 8am (submission via email on Friday April 9th at 2pm).

Final Exam: Monday, May 3rd, at 10am.

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

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		

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 20th –22nd):
 - 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 25th – 29th):
 - a. Pure strategy Nash equilibrium and applications-I.
 - b. *Recommended readings:* H: 4-6, O: 2-3.
 - c. *Optional readings (Masters):* G:1.1.C, D: 5-6, HE: 6-7, T: 5, AC: 2.6

3. **Week 3** (February 1st – 5th):
 - 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 8th – 12th):
 - 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 15^h – 19th):
 - a. Monday, February 15th is Presidents Day (Holiday).
 - b. Zero-sum games.
 - c. *Recommended readings*: W: 12, H: section 7.6.
 - d. *Optional readings (Masters)*: O: 11, D: 10, HE: 12, AC: 2.5, 9.2
6. **Week 6** (February 22nd – 26th):
 - 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** (March 1st – 5th):
 - a. Applications of extensive form games.
 - b. *Recommended readings*: W: 16, 18, 19.
 - c. *Optional readings*: O: 6-7, G: 2.1.C-2.1.D, D: 12, HE: 20-21, AC: 4.3-4.4.
 - d. Midterm exam #1: Friday, March 5th, in class.
8. **Week 8** (March 8th – 12th):
 - 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 15th – 19th):
 - a. March 17th - NO CLASSES
 - b. Infinitely repeated games and its applications-II.
 - c. *Recommended readings*: H: 13-14.
 - d. *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 22nd – 26th):
 - 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.
11. **Week 11** (March 29th – April 2nd):
 - 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.
12. **Week 12** (April 5th – 9th):
 - 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 9th at 8am.
- Week 14** (April 12th – 16th):
 - e. Signaling games-II.
 - f. *Recommended readings*: W: 29, H: 11.
 - g. *Optional readings (Masters)*: T: 17, AC: 8.7, O: 10, G: 4.2.C-4.2.D.
13. **Week 15** (April 19th – 23rd):

- a. Cheap talk games.
 - b. *Recommended readings*: H: 12.
 - c. *Optional readings (Masters)*: T: 18, O: 10.
14. **Week 16** (April 26th – 30th):
- a. Equilibrium refinements: The “Intuitive Criterion” (Handouts).
15. **Week 17** (May 3rd – 7th):
- a. Final Exams’ week: Monday May 3rd at 10am.

Attendance and Participation:

Students are expected to attend all scheduled class times, as attendance and participation contribute significantly to learning in this course. If you feel miss a class, it is your responsibility to find out from an informed student what occurred in class, what assignments may have been given, etc. Assignments are due at the beginning of class (as described below). Late work is subject to significant grade reduction, depending upon the assignment.

Students with Disabilities:

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center at <http://www.drc.wsu.edu/>, stop by their office at the Admin Annex Building, Room 205; or call 509-335-3417. All accommodations must be approved through the Disability Resource Center.

Academic Integrity:

Academic integrity will be strongly enforced in this course. Any student caught cheating on any assignment will be given an F grade for the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions: <http://conduct.wsu.edu/default.asp?PageID=338>.

WSU Safety:

WSU is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/emergencies> to become familiar with the information provided.

Lauren's Promise

I will listen and believe you if someone is threatening you. Lauren McCluskey, a 21-year-old honors student athlete, was murdered on Oct. 22, 2018, by a man she briefly dated on the University of Utah campus. We must all take actions to ensure that this never happens again.

- If you are in immediate danger, call 911.
- If you are experiencing sexual assault, domestic violence, and stalking, please report it to me and I will connect you to resources or call Alternatives to Violence of the Palouse at 877-334-2887 (24-hour crisis hotline).

Any form of sexual harassment or violence will not be excused or tolerated at Washington State University. WSU has instituted procedures to respond to violations of these laws and standards, programs aimed at the prevention of such conduct, and intervention on behalf of the victims. WSU Police officers will treat victims of sexual assault, domestic violence, and stalking with respect and dignity. Confidentiality is of the utmost importance and WSU Police will assist by providing resources to victims. In addition to its law enforcement efforts regarding sexual assault, domestic violence and stalking, WSU Police refer victims to the appropriate university and/or local community counseling and other resources devoted to assisting victims.

Advocates help survivors determine their own needs in regards to their physical and emotional health, reporting options, and academic concerns. They connect survivors to campus and community services, and provide accompaniment to important appointments (court, hospital, and police) and support throughout the process. WSUPD can also connect you with advocacy services, if desired. The local advocacy group is Alternatives to Violence of the Palouse, whose services are free, immediate, and confidential.

Other confidential resources include WSU Counseling and Psychological Services. If you would like to speak with a counselor after business hours, WSUPD can contact the on-call counselor and have them call you directly or a crisis telephone number is provided. Information shared with the counselor will not be provided to WSUPD without expressed permission from you. WSU Counseling and Psychological Services 509-335-2159 (crisis services line)

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