

# ECONS 503 - MICROECONOMIC THEORY-II

## SPRING 2020

<https://felixmunozgarcia.com/econs-503/>

**Instructor:** Felix Munoz-Garcia

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**Lectures:** Hulbert 27,  
Mondays, Wednesdays and Fridays. 10:10-11:00pm.

**Office hours:**  
Mondays, 12:00-1:00pm, and  
Wednesdays, 3:00-4:00pm.  
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**Review sessions:**  
Wednesdays, 12:00pm, Hulbert 27.

**Office hours:** Thursdays, 2:00–3:00p.m., and by appointment.

### *Course Rationale*

This course introduces students to game theory, economics of information and contracts, general equilibrium theory and social choice theory. Several applications and empirical implications will be discussed.

### *Course Objectives and Learning Outcomes*

The main objective of the course is to make students be able to apply the tools of advanced microeconomic theory to understand and model *strategic* decision making. In addition, the topics learned in this course should prepare the student for a better understanding of the concepts he/she will learn in second-year Ph.D. courses, such as Industrial Organization, Environmental Economics and Public Economics. Furthermore, the theoretical approach of the course (and many of the mathematical tools explained) will set stronger foundations for analyzing economic problems, not only from a microeconomic perspective but also in other fields in economics.

### *Prerequisites:*

Intermediate Microeconomics and some college algebra and calculus are expected. Some books on mathematical methods in economics are suggested below, as a helpful support during the course, and are strongly recommended.

### *Required Textbooks:*

- *Game Theory: An Introduction* by Steven Tadelis. Princeton University Press. 2013.
- *Strategy and Game Theory: Practice Exercises with Answers*. Munoz-Garcia, F. and D. Toro-Gonzalez. Springer Verlag, 2nd edition, 2019.

You can find all textbooks at the Washington State University Bookstore (“Bookie”).

*Recommended reading (Game Theory):*

**Undergraduate-level game theory.** Here is list of some of the most popular game theory textbooks used at the undergrad level. I only included those that are close in their rigor to a Master program:

- *An Introduction to Game Theory.* Martin Osborne. Oxford University Press. 2004. (Combines verbal explanations with some rigor).
- *Game Theory for Applied Economists.* Robert Gibbons. Princeton University Press. 1992. (Very short!)
- *Game Theory: Interactive Strategies in Economics and Management.* Aviad Heifetz. Cambridge University Press. 2012.
- *Games and Decision Making.* Charalambos D. Aliprantis and Subir K. Chakrabarti. Oxford University Press. 2011 (second edition).

**Graduate-level game theory.** If your game theory background is relatively strong, here are some textbooks that might be useful:

- *Game Theory,* Drew Fudenberg and Jean Tirole. MIT Press. 1991.
- *Game Theory.* Michael Maschler, Eilon Solan, and Shmuel Zamir, Cambridge University Press, 2013.
- *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. (Not a theory book, but a review of experimental tests of standard games.)
- *Advanced Microeconomic Theory.* Geoffrey A. Jehle and Philip J. Reny. Prentice Hall. (Third edition). 2011.
- *Advanced Microeconomic Theory: An Intuitive Approach with Examples.* Felix Munoz-Garcia. MIT Press. 2017.

Applications of Game Theory to Industrial Organization:

- *The Theory of Industrial Organization.* Jean Tirole. MIT Press. 1988.
- *Industrial Organization. Markets and Strategies.* Paul Belleflamme and Martin Peitz. Cambridge University Press. 2015.
- *Advanced Industrial Economics.* Stephen Martin. Blackwell Publishers. 2001.

Applications of Game Theory to Information Economics and Contract Theory:

- *Contract Theory.* Patrick Bolton and Mathias Dewatripont. MIT Press. 2004.
- *A Theory of Incentives in Procurement and Regulation.* Jean-Jacques Laffont and Jean Tirole. MIT Press. 1993.

- *An Introduction to the Economics of Information: Incentives and Contracts*. Ines Macho-Stadler and David Perez Castrillo. Oxford University Press. 2001.
- *The Theory of Incentives: The Principal-Agent Model*. Jean-Jacques Laffont and David Martimort. Princeton University Press. 2002.
- *The Economics of Contracts: A Primer*. Bernard Salanie. MIT Press. 2nd Edition. 2005.

Applications of Game Theory to Mechanism Design:

- *An Introduction to the Theory of Mechanism Design*, by Tilman Borgers and Daniel Krahmer, Oxford University Press, 2015.
- *Game Theory and Mechanism Design*, by Y. Narahari, IISc Lecture Notes, 2014.
- *A Toolbox for Economic Design*, by D. Diamantaras et al., Palgrave Publishers, 2009

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, Y. Katsoulacos, and A. Xepapadeas. Springer. 1996.
- *Oligopoly, the Environment and Natural Resources*. Luca Lambertini. Routledge Publishers. 2013.

Recommended Reading (Mathematics):

Most comprehensive:

- Carl P. Simon and Lawrence E. Blume. *Mathematics for Economists*. W. W. Norton.
- Michael Hoy, John Livernois, Chris McKenna, Ray Rees and Anthanassios Stengos. *Mathematics for Economists*. MIT Press.
- Angel de la Fuente. *Mathematical methods and models for economists*. (Any edition might work). Cambridge University Press. [Specially recommended for the macro applications.]

Also recommended (refreshing undergrad mathematics):

- Alpha Chiang. *Fundamental Methods of Mathematical Economics*. (Any edition). McGraw-Hill.
- Knut Sydsaeter and Peter I. Hammond. *Mathematics for Economic Analysis*. (Any edition) Prentice Hall.
- Michael Klein. *Mathematical Methods for Economics*. (Any edition) Addison-Wesley.

Also recommended (although not so comprehensive):

- Russel A. Gordon. *Real Analysis, A first course*. Second edition. Addison Wesley. [A very gentle introduction to real analysis].
- Robert G. Bartle and Donald R. Sherbert. *Introduction to real analysis*. 3<sup>rd</sup> edition. Wiley. [Another gentle introduction to real analysis.]

- William Trench. *An Introduction to Real Analysis*. Free downloadable textbook at: <http://ramanujan.math.trinity.edu/wtrench/misc/index.shtml>. [Recommended if you never had courses on real analysis before.]
- Rangarajan K. Sundaram. *A first course in optimization theory*. Cambridge University Press. [Very good introduction to real analysis, and its connection with maximization problems.]

*Lectures:*

Lectures will be held in Hulbert Hall 27, on Mondays, Wednesdays and Fridays 10:10–11:00a.m. Attendance is very important to your success in this class.

*Review Sessions (Practice sessions):*

Your teaching assistant will be holding review sessions every week. You will cover exercises similar to those you will have to solve in your homework assignments and exams. The TA will go over each step that you have to use in order to solve these exercises. Attendance is strongly recommended, and has proven very useful in previous editions of this course.

Time: Wednesdays, 12:00-1:00pm..

Classroom: Hulbert 27 (this classroom is still to be confirmed).

*Class materials:*

All class materials (handouts, additional readings, homework assignments, answer keys, etc.) will be posted on the website: <https://felixmunozgarcia.com/econs-503/>.

*Grading:*

Your grade for the course will be based on:

- Problem sets (35%),
- Two midterms (20% each), and
- Final exam (25%).

*Exam dates:*

**Midterm #1:** Friday, February 21<sup>st</sup>, in class.

**Midterm #2:** Friday, April 3<sup>rd</sup>, in class.

**Final exam:** Thursday, May 7<sup>th</sup>, 8:00-10:00am, in class.

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.

*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.

## DESCRIPTION OF COURSE REQUIREMENTS

*Homework:*

Homework assignments will be posted on the course website (almost) every Monday, and they must be submitted the next Monday at the beginning of the class. 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 submitted per student. Working in groups has proven to be a very successful learning technique for previous students of this course. Additional practice problems will be provided if required.

*Grading scale:*

A	88-100	C	55-59
A-	80-87	C-	50-54
B+	74-79	D+	45-49
B	70-75	D	40-44
B-	65-69	F	0-39
C+	60-64		

Note: Grades will not be curved.

*Course Schedule:*

The course schedule is tentative. Legend for the textbooks: Osborne (O) and Gibbons (G), Heifetz (HE), Tadelis (T), Fudenberg and Tirole (FT), Maschler et al (M), Vega-Redondo (V), and Aliprantis and Chakrabarti (AC).

1. **Week 1:**
  - a. General equilibrium.
  - b. *Recommended readings:* Munoz-Garcia 6.4-end of Chapter 6 (including appendices), and JR 5.
2. **Week 2:**

- a. Monday, January 20<sup>th</sup> is Martin Luther King Jr. Day (Holiday, no class).
  - b. Introduction and Dominance solvable games.
  - c. *Recommended readings*: T: 3-4, G: 1.1.A-1.1.B.
  - d. *Optional readings*: AC: 1-2.3, HE: 1-5, FT: 1.1 and 2, M: 3 and 4.1-4.7, V: 1.1-1.4, 2.1.
3. **Week 3:**
- a. Pure strategy Nash equilibrium and applications.
  - b. *Recommended readings*: T: 5, G: 1.1.C and 1.2.
  - c. *Optional readings*: O: 2-3, HE: 6-9, AC: 2.6 and 2.8, FT: 1.2 M: 4.8-4.15, V: 2.2 and 3.
4. **Week 4:**
- a. Mixed strategy Nash equilibrium and applications. Zero sum games.
  - b. *Recommended readings*: T: 6, G: 1.3-1.4, and O: 11.
  - c. *Optional readings*: O: 4, HE: 10-12, AC: 2.4-2.5, FT: 1.3.1, M: 5, V: 1.5 and 2.3.
5. **Week 5:**
- a. Extensive form games and subgame perfect equilibrium.
  - b. *Recommended readings*: T: 7-8, G: 2.1.A-2.1.B.
  - c. *Optional readings*: O: 5, HE: 18-19, AC: 3-4.2, FT: 3, M: 7.1-7.2, V: 4.1-4.3.
6. **Week 6:**
- a. Applications of extensive form games.
  - b. *Recommended readings*: O: 6-7, G: 2.1.C-2.1.D.
  - c. *Optional readings*: HE: 20-21, AC: 4.3-4.4, M: 7.3-7.4, V: 5.
7. **Week 7:**
- a. Monday, February 17<sup>th</sup> is Presidents Day (Holiday, no class).
  - b. Repeated games and its applications-I.
  - c. *Recommended readings*: T: 10, G: 2.3.A-2.3.B.
  - d. *Optional readings*: HE: 23, AC: 6.1-6.3, FT: 4 M: 13, V: 8.
8. **Week 8:**
- a. Repeated games and its applications-II.
  - b. *Recommended readings*: O: 14-15, G: 2.3.C-2.3.D.
  - a. *Optional readings*: HE: 24, AC: 6.4-6.5, FT: 5, V: 9.
9. **Week 9:**
- a. Simultaneous games under incomplete information and its applications.
  - b. *Recommended readings*: T: 12-14, G: 3.1-3.4.
  - a. *Optional readings*: O: 9, AC: 8.1-8.6, FT: 6 and 7, M: 9.1-9.7, V: 6.1-6.3 and 7.
10. **Week 10 (March 16<sup>th</sup> to 20<sup>th</sup>):**
- a. Spring break.
11. **Week 11:**
- a. Signaling games and Equilibrium refinements.
  - b. *Recommended readings*: T: 16-17, G: 4.1-4.2.D.
  - c. *Optional readings*: O: 10, AC: 8.7, FT: 8 and 11.2, V: 6.4.
12. **Week 12:**
- a. Cheap talk games.
  - b. *Recommended readings*: T: 18, G: 4.3.A., and Grossman and Helpman, Ch 4.
  - c. *Optional readings*: FT 8.
13. **Week 13:**
- a. Adverse Selection and Screening.
  - b. *Recommended readings*: Munoz-Garcia, 10.4-10.6, MWG 13, and Bolton and Dewatripont, Ch 2.
14. **Week 14:**
- a. Moral hazard.
  - b. *Recommended readings*: Munoz-Garcia, 10.1-10.3, MWG 14, and Bolton and Dewatripont, Ch 4.
15. **Week 15:**
- a. Mechanism design.
  - b. *Recommended readings*: T: 14, MWG 23, and JR 9.3-9.5.
16. **Week 16:**
- a. Social choice theory.

- b. *Recommended readings*: JR 6.
- 17. **Week 18:**
  - a. Final Exam, Thursday, May 7<sup>th</sup>, 8:00-10:00am, in class..