

EconS 424 - STRATEGY AND GAME THEORY

SPRING 2017

Instructor: Brett Devine	Location: Hulbert Hall 27
Time: M,W,F 11:10 AM -Noon	Email: brett.devine@wsu.edu
Review Sessions: TBD	Office: 323B Hulbert Hall
Office Hours: M, W, F: 12 - 2:00 PM T, Th: By Appointment	Course Website: Blackboard

Disclaimer: This syllabus and the course outline and schedule are subject to change according to class needs and interests.

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 models 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), or how different firms or institutions behave every time they face a 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.

Prerequisites

Intermediate Microeconomics (EconS 301) is required. Both algebra and calculus will be used in this course. If you have concerns about your preparation please come and see me.

Required Text

Games, Strategies and Decision Making. Joseph Harrington Jr.; Worth Publishers. (Second Edition) 2014. The book can be found at the Washington State University bookstore (Bookie), Crimson and Gray and Amazon.com.

Description of Course Requirements

Grades for the course will be determined through in-class and out-of-class participation in strategic games and success on problem sets, projects and exams.

Requirement Type	Percent of Total Points
Participation	15
Problem Sets	35
Projects	15
Midterm Exam	15
Final Exam	20
100	

Here is how the grading works. Consider requirement type R_i where i corresponds to a requirement type in the above table that has p_i percent of the total points. Suppose during the semester that a total y_i points were available for requirement R_i and that you score x_i percent of those points y_i points. Then $x_i p_i$ is your total score for requirement R_i . Your total score, S for the class is calculated as

$$S = 100 \cdot \sum_i x_i p_i$$

Your total class score of S is then mapped into letter grades according to the following schedule.

Letter Grade Schedule

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

Example Suppose you get 90% of participation points, 85% of homework points, 95% of project points, a 86% on the midterm exam and a 92% on the final exam. Then your final score is

$$\begin{aligned} S &= 100 \cdot \sum_i x_i p_i \\ &= 100[0.90(0.15) + 0.85(0.35) + 0.95(0.15) + 0.86(0.15) + 0.92(0.20)] \\ &= 88.8 \end{aligned}$$

A final score 88.8 results in a letter grade of A-.

Participation

Students will score participation points through playing (and playing well) strategic games both in and outside of class. These games and experiments will facilitate more intuitive understanding of the often formal concepts in game theory and we need everyone's participation to make these work optimally.

Problem Sets

Several homework assignments requiring the solving and analysis of several strategic games will be required during the semester. While the games we play in and out of class will often provide intuition, the problem sets will help to solidify intuition into more rigorous understanding.

Projects

The purpose of the projects to give students a more enjoyable and creative opportunity to apply game theoretic principles to real-world issues that interest them and escape the "here is a problem, solve it. Here is another problem, solve it" grind. The projects will be tailored to the interests and needs of each particular class.

Exams

A single midterm exam will be proctored sometime in the middle of the semester (exact date TBD). A final exam worth 20% of your final grade will be given during finals week.

Course Outline

The following schedule is tentative and still developing as the needs and interests of the class are revealed.

Readings preceding an (H) represent chapters from Harrington's textbook (the required text) while (W) refers to Watson's textbook.

Week 1: January 9 - January 13: Modeling Games

- ☐ Strategic reasoning and model building: (H) 1, 2

Week 2: January 16 - January 20: Dominance and Nash Equilibria

- ☐ Solving a game when rationality is common knowledge: (H) 3
- ☐ Nash equilibrium in 2-3 player strategic form games: (H) 4

Week 3: January 23 - January 27: Mixed Nash Equilibria

- ☐ Pure and mixed strategy Nash equilibria: (H) 4, 7

Week 4: January 30 - February 3

- ☐ **PROBLEM SET 1 DUE:** *Monday, January 30 at beginning of class*
- ☐ Security strategies and zero sum games: (H) 7
- ☐ *N*-player symmetric and asymmetric games, network effects, tipping and congestion: (H) 5

Week 5: February 6 - February 10

- ☐ **PROBLEM SET 2 DUE:** *Monday, February 6 at beginning of class*
- ☐ **PARTICIPATION:** *Feb 6 - Feb 7 Bargaining competition on MobLab*
- ☐ Nash equilibrium with continuous strategies: (H) 6
- ☐ Sequential Games and Subgame Perfect Nash Equilibria: (H) 8, 9
- ☐ **PROBLEM SET 3 DUE:** *Friday, February 10 at 11:59 PM on Blackboard*

Week 6: February 13 - February 17

- ☐ Sequential Games and Subgame Perfect Nash Equilibria: (H) 8, 9
- ☐ Strategic Pre-commitment: (H) 8,9 and notes
- ☐ **PROBLEM SET 4 DUE:** *Friday, February 17 at 11:59 PM on Blackboard*

Week 7: February 20 - February 24

- ☐ NO CLASS on Monday - President's day
- ☐ Bargaining: (H) 8,9 and notes

Week 8: February 27 - March 3

- ☐ More sequential games applications and review
- ☐ **PROBLEM SET 5 DUE:** *Wednesday March 1 at 11:59 PM on Blackboard*
- ☐ **MIDTERM EXAM:** *Friday March 3 in-class*

Week 9: March 6 - March 10

- ☐ Repeated Games, Cooperation and Reputation: (H) 13, 14
- ☐ **PROJECT 1 DUE:** *Write-up Friday at 11:59 PM on Blackboard*

Week 10: March 13 - March 17

- ☐ Spring Break

Week 11: March 20 - March 24

- ☐ Repeated Games, Cooperation and Reputation: (H) 13, 14
- ☐ **PROBLEM SET 6 DUE:** *Friday March 24 at 11:59 PM on Blackboard*

Week 12: March 27 - March 31

- ☐ Games of Incomplete Information: (H) 10

Week 13: April 3 - April 7

- ☐ Games of Incomplete Information: (H) 10
- ☐ Auctions: notes
- ☐ **PROBLEM SET 7 DUE:** *Friday April 7 at 11:59 PM on Blackboard*

Week 14: April 10 - April 14

- ☐ Signaling Games: (H) 11
- ☐ **Project 2 DUE:** *Write-up Friday at 11:59 PM on Blackboard*

Week 15: April 17 - April 21

- ☐ Signaling Games: (H) 11
- ☐ **PROBLEM SET 8 DUE:** *Friday April 21 at 11:59 PM on Blackboard*

Week 16: April 24 - April 28

- ☐ Intuitive Criterion and applications: (H) 11 and notes
- ☐ Extra-credit projects due Friday April 28 by 5:00 PM
- ☐ **LAST DAY OF CLASS:** *Friday April 28*

Week 17: May 1 - May 5

☐ Final Exam

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>
- <http://oem.wsu.edu/emergencies>

and 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.