

Spring 2-1-2018

## ECNS 405.01: Game Theory

Amanda E. Dawsey

University of Montana - Missoula, [Amanda.Dawsey@umontana.edu](mailto:Amanda.Dawsey@umontana.edu)

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**Syllabus**  
Economics 405  
Game Theory  
Liberal Arts 203

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Amanda Dawsey	Office: LA 402
Email: amanda.Dawsey@umontana.edu	Office phone: 243-2926
	Office hours: MWF 10 – 11 AM

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**Class Description and Learning Objectives:**

Economics 405 is an introduction to the tools of game theory and how they may be applied. In many situations, one individual's choices will affect another's welfare, and vice versa. Game theory is a method of analyzing situations where decisions are interrelated and each agent recognizes this fact and makes decisions strategically. Our primary focus will be on competitive games of perfect information, and we will examine games with less-than-perfect information as time permits. During this course, you will learn the following:

1. How to read and interpret a game matrix and how to diagram a static strategic problem using a game matrix.
2. Under what conditions a Nash equilibrium exists.
3. The definition and use of mixed strategies.
4. How to read and interpret a game tree, and how to diagram a dynamic strategic problem using a game tree.
5. What equilibrium concepts are appropriate for different types of games (static vs. dynamic, perfect vs. imperfect information), and how to identify these equilibria.

**Practical Issues:**

1. **TEXTBOOK: You must have access to moodle to fully participate in this class.** I also recommend you purchase the textbook:

*Games, Strategies, and Decision Making*, by Joseph E. Harrington, Jr.

## 2. CLASSROOM ENVIRONMENT:

If you miss a class, it is your responsibility to get any notes, announcements, or assignments, from your classmates. I will send class information to your university email address. You will need to either check this account regularly or set up message forwarding to your preferred email address.

This course is accessible to and usable by otherwise qualified students with disabilities. Talk to me if you'd like to request reasonable program modification. For more information, visit the Disability Services website at <http://www.umt.edu/dss>.

## 3. GRADING:

Your final grade will be based on your performance on problem sets and exams. There will be four exams during the semester, plus an exam given during final exam week. I will drop one exam.

Problem Sets	12%
Exam 1 (February 16)	22%
Exam 2 (March 9)	22%
Exam 3 (April 6)	22%
Exam 4 (April 30)	22%
Exam 5 (May 7, 3:20–5:20)	22%

These numbers sum to more than 100%, but **one exam will be dropped**. I expect you to know and abide by the Student Conduct Code in all matters pertaining to this course. Violations of this code will be pursued in accordance with the code.

### *Exam policy.*

Make sure you don't have a conflict with the exam dates above. If you miss an exam during the regular semester without a university excuse, you must take the final, which will be comprehensive. You will be allowed to take a make-up exam only if (1) you have a valid university excuse for missing the exam and (2) you show me evidence of your excuse (a doctor's note, for example) as soon as you are able.

### *Problem sets:*

There will be four graded problem sets. These exercises are intended to allow you to practice using the skills discussed in the textbook and in class and to familiarize you with the types of questions that will be on exams.

**Tentative Course Schedule:** The material we cover is subject to change, but problem set due dates and exam dates will not change.

Week	Date	Topic	Reading	Quiz/Test
1	Jan 29 – Feb 2	Introduction, math review and notation	Chapter 1	
2	Feb 5 – 9	Normal form games: strategies and payoffs	Chapter 2	PS 1 Due Feb 9
3	Feb 12 – 16	Dominance and best response	Chapter 3	<b>Exam 1</b> Feb 16
	Feb 19	<b>Presidents Day: No Class</b>		
4	Feb 21 – 23	Nash Equilibria	Chapters 4 & 5	
5	Feb 26 – Mar 2	Applications, oligopoly	Chapter 6	PS 2 Due Mar 2
7	Mar 5 – 9	Mixed strategy equilibria	Chapter 7	<b>Exam 2</b> Mar 9
8	Mar 12 – 16	Dynamic games	Chapter 8	
9	Mar 19 – 23	Backward induction and subgame perfection		PS 3 Due Mar 23
10	Mar 26 – 30	<b>Spring Break: No Class</b>		
11	April 2 – 6		Chapter 13	<b>Exam 3</b> April 6
12	April 9 – 13	Repeated games	Chapter 14	
13	April 16 – 20	Collusion in repeated games		
14	April 23 – 27	Imperfect Information	Chapters 9 & 10	PS 4 Due April 25
15	April 30 – May 4			<b>Exam 4</b> April 30
	Monday, May 7	<b>Exam 5: 3:20 – 5:20 PM</b>		