

ECON 4750: Intro to Game Theory

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Fall 2017

It should be noted that this course syllabus provides a general plan for the course and deviations may be necessary.

Important Dates:

08/25 – Last Day to add/drop classes
09/04 – Labor Day (University official holiday – no classes)
10/10 – Semester Midpoint; Last Day to Withdraw
11/20 – 11/25 – Thanksgiving Break (University official holiday - no classes)
11/27 – Project due date
12/04 – Last day of lectures
12/06 – Final exam (13:30-16:00)

Statement on Academic Honesty: Students are expected to abide by GSU's policy on academic honesty, which is published in the student handbook. A portion of this policy follows:

“...As members of the academic community, students are expected to recognize and uphold standards of intellectual and academic integrity. The University assumes as a basic and minimum standard of conduct in academic matters that students be honest and that they submit for credit only products of their own efforts... The student is responsible for understanding the legitimate use of resources; the appropriate ways of acknowledging academic, scholarly, or creative indebtedness; and the consequences of violating this responsibility” [Please see the Policy on Academic Honesty (Section 409).]

If you have questions about academic honesty, please see me.

Location: Room 302, Aderhold Learning Center

Time: Mondays and Wednesdays, 1:30pm-2:45pm

Office Hours: MW, 9:45-11:00am, and by appointment

Evaluation: Grading will be based on homework assignments (posted on iCollege regularly), two tests, a group project and presentation, and a final examination (comprehensive) with the following weights:

Homework Assignments:	20%
Tests (2):	30% (15% each)
Group Project:	15%
Final Exam (Wednesday, Dec 6; 13:30-16:00):	35%
Extra credits:	up to 7%

When computing the average problem set score to enter your grade, your lowest individual score will be dropped. A letter grade of the following: A+, A, A-, B+, B, B-, C+, C, C-, D and F, will be assigned to you on the basis of your cumulative score. See the converting table below.

For the **Honor students** enrolled in this class, I will ask each of you to do an extra project. This project will split the 20% weight of the homework assignments toward your final grade: 5% for the project and 15% for the (regular) homework assignments.

Converting table:

A+: 97%-100%	A: 93%-96%	A-: 90%-92%
B+: 87%-89%	B: 83%-86%	B-: 80%-82%
C+: 77%-79%	C: 73%-76%	C-: 70%-72%
D: 60%-69%	F: 0%-59%	

Problem sets: Problem sets will be posted on the class website via iCollege and their due dates (typically on Wednesdays) are listed in the schedule below. You can download them from the class website on the dates they are assigned. Late problem sets will not be accepted. (The ability to drop your lowest score gives you protection against accidents.) In particular, problem sets must be received in class by the end of lecture on the day the problem set is due. (Under the appropriate circumstances, including a Dean's excuse, you may be excused from a problem set without penalty.) Problem sets will be handed back to you in class the Monday immediately after the due date.

Course Policies: Regular attendance is expected. **I may withdraw you from the course for excessive absences without your permission or prior notification of excessive absences.** No late homework is accepted, no make-up exams are offered. Extenuating circumstances will be handled on an individual basis. I will offer some opportunities for you to earn extra credits (up to 7 points toward your cumulative score). Be considerate to others: (a) Showing up late or leaving early is inconsiderate to the instructor and to your classmates. Please: don't do it. (b) The noises we make when we're getting ready to leave (such as shoving things in backpacks and zipping them up) are distracting when class is not yet over. You'll always be dismissed promptly at the end of class. Please: do not rustle your things beforehand. (c) Any electronic devices that could be heard by others must be turned off before class, and, of course, as a courtesy and show of respect we don't engage in web surfing or texting during class. (d) Students are expected to be familiar with Georgia State University's Policy on Academic Honesty (Section 409). Here is a link to Section 409: <http://www2.gsu.edu/~wwwfhb/sec409.html>. (e) The Course website (on iCollege) is an integral part of the class; please check it on a regular basis.

Others: (1) Students who wish to request accommodation for a disability may do so by registering with the Office of Disability Services. Students may only be accommodated upon issuance of the Office of Disability Services of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which accommodation is sought. (2) Your constructive assessment of this course plays an indispensable role in shaping education at GSU. Upon completion of the course, please take time to fill out the online course evaluation.

Recommended Textbook: A. Dixit, S. Skeath and D. Reiley, *Games of Strategy*, 3rd edition, 2009 or 4th edition, 2015, W.W. Norton & Company: New York.

Prerequisites: There is no prerequisite for this course. But students should be comfortable with mathematical notation and formal reasoning.

Course Description and Objectives: Game theory, also known as multi-person decision theory, analyzes situations in which payoffs to players depend on the behavior of other players as well as the player himself/herself. Game theory has found many applications in various fields, such as economics, biology, business, law, politics, sociology, and computer science. The purpose of this course is to introduce the basics of game theory to undergraduate students in various disciplines. It focuses on fundamentals of game theory including basic concepts and techniques, various ways of describing and solving games, and various applications in economics, political sciences, and business. It will help students sharpen their understanding of strategic behavior in different situations involving

many individuals. The students will learn how to recognize and model strategic situations, to predict when and how their action will have an influence on others, and to exploit strategic situations for the benefit of their own.

Learning Outcomes: Students should be able (1) to distinguish a game situation from a pure individual's decision problem, (2) to explain concepts of players, strategies, payoffs, rationality, equilibrium, (3) to describe sequential games using game trees, and to use the backward induction to solve such games, (5) to describe simple simultaneous-move games using game tables, and to explain concepts of dominant, dominated, and rationalizable strategies, pure and mixed strategies, and best responses, (6) to find dominant strategy equilibrium, pure and mixed strategy Nash equilibrium, (7) to describe simple games involving both sequential- and simultaneous-moves, and to explain and to find sub-game perfect Nash equilibrium, (8) to explain concepts of asymmetric information, and to analyze simple signaling games, (9) to analyze repeated games, and to explain the folk-theorem.

Course Outline: The following is a rough outline.

Week 1 (Aug. 21, 23). Decisions and Games (Chapters 1 and 2)

Week 2 (Aug. 28, 30). Sequential Games (Chapter 3)

Problem Set 1 (available on Aug 30, due: Wednesday Sept 6)

Weeks 3-4 (Sept 6, 11, 13). Simultaneous-Move Games I (Chapter 4)

Problem Set 2 (available on Sept 13, due: Wednesday Sept 20)

Week 5 (Sept 18, 20). Simultaneous-Move Games II (Chapters 5, 7, 8)

Problem Set 3 (available on Sept 20, due: Wednesday Sept 27)

Week 6 (Sept 25, 27). Combining Sequential and Simultaneous Moves (Chapter 6)

Some practice exam questions and their answers will be posted on the class website.

Week 7 (Oct 2). Review

Test #1: Oct 4

Week 8 (Oct 9, 11). Uncertainty and Information (Chapter 9 (Ch. 8))

Problem Set 4 (available on Oct 11, due: Wednesday Oct 18)

Week 9 (Oct 16, 18). Strategic Moves (Chapter 10 (Ch. 9))

Problem Set 5 (available on Oct 18, due: Wednesday Oct 25)

Week 10 (Oct 23, 25). Repeated Games (Chapter 11 (Ch. 10))

Problem Set 6 (available on Oct 25, due: Wednesday Nov 1)

Week 11 (Oct 30, Nov 1). Collective-Action Games (Chapter 12 (Ch. 11)), Review

Some practice exam questions and their answers will be posted on the class website.

Test #2: Nov 6

Week 12 (Nov 8). Evolutionary Games (Chapter 13 (Ch. 12))

Problem Set 7 (available on Nov 8, due: Wednesday Nov 15)

Week 13 (Nov 13, 15). Mechanism Design and Auctions (Chapters 14, 17 (Ch. 13, 16))

Problem Set 8 (available on Nov 15, due: Wednesday Nov 27)

Week 14 (Nov 20, 22). Thanksgiving Holiday, No classes.

Project Due: Nov 27, 10am

Week 15 (Nov 27, 29). Group Presentations

Some practice exam questions and their answers will be posted on the class website.

Week 16 (Dec 4, 6). Review (Dec 4)

Final Exam (Wednesday, Dec 6, 1:30pm-4:00pm)