

The University of Kentucky
Department of Economics
Introduction to Game Theory (ECO/MA 327)
Spring 2019

Instructor

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223R Gatton College of Business & Economics
Class Hours: MW 3:00-4:15PM
Classroom: Gatton 171
Office Hours: Mondays and Wednesdays 12:00-1:30PM (or by appointment).

If you need to contact me, please use my UK email ryan.hanson@uky.edu. Do not contact me through Canvas. I will try my best to respond quickly but please allow me some time (and a little more time during the weekends).

Course Description

Game theory provides a versatile toolkit for analyzing the interactions between strategic players. While this course will focus on strategies between different types of firms, it can also be used for a variety of fields: winning strategies for tic-tac-toe, insurance payout design, when/where to open a business, and more. In such situations game theory can guide us to improve our actions and help us to understand observed behavior patterns.

Time permitting, this course will introduce the basic concepts of game theory: dominant strategies, Nash equilibrium, mixed strategies, backward induction, sub-game perfect equilibrium, cooperation through repeated interaction, and incomplete information.

The best way to learn game theory is by applying it to examples. As such, we will do so extensively in class, in homework assignments, and in practice problems throughout the semester.

Course Details

Prerequisite

A grade of B or better in MA 113, MA 132, or MA 137 (or equivalent). However, students should feel very comfortable with calculus.

Required Textbook

The textbook we will be using for this class is the *Strategy: An Introduction to Game Theory (3rd edition)* by Joel Watson (Publisher: Norton). While we will work through Watson's book closely, you might also want to review other books or sources for your understanding. I encourage students to have a Calculus I book (or notes) nearby when doing homework and studying in case you need to refresh yourself on the different rules or techniques.

Teaching Philosophy and Methods

I love teaching and I look forward to interacting with you throughout the semester about game theory and other concerns you might have. Class time will be a mixture of lecture and active learning in order to involve you in an active discussion of the main principles and ideas. In class, you will **regularly work together with your classmates**. I will ask you to compare answers to a problem or work together on a question with your neighbor(s). Working together in class will serve as a nice break from lecture and will increase the amount that you learn.

Problem sets

There will be (no more than) 5 problem sets. I will expect each student to clearly write and explain their answers for the questions. Please take time to write each step of the calculation or explanation of how you arrived at the answer. All assignments are due at the start of class. Late assignments will be accepted for 24 hours after the due date at a 30% penalty. After the assignments are graded by me, please make sure you check the answers with the keys provided. Problem sets are designed to help students prepare for exams and to check their understanding of key concepts for the course.

Class Participation Assignments (CPAs)

While there is no formal attendance policy for this course, in order to ensure that students understand key concepts and prepare for class there will be (at least) seven Class Participation Assignments (CPAs). These will be short 5-10 minute assignments, typically small quizzes, that will ask one or two questions related to the reading, previous lecture notes, or other class-related concerns. I will try to emphasize the material that will be on the quizzes ahead of time but may also use these to check your understanding on concepts before deciding to move to the next topic.

These assignments will usually be announced in advance, but may be unannounced in order to encourage consistent class attendance and participation. **Only the 5 highest CPA scores will be kept and used when calculating your CPA average.** If you miss an in-class CPA for an unexcused absence, you cannot make up the CPA and will receive a zero for the assignment. As of now, there are 7 CPAs scheduled for the course. If I decide to add more, I will still only keep the top 5 scores for each person.

Exams

There are two midterm exams and a final exam, each out of 100 points. The exams cover material from class lecture, the textbook, and any other assignments. The final exam is cumulative. The other two exams will not be cumulative; however, the course material builds upon itself, so each exam will include concepts from previous exams. The dates for the exams are:

- Exam I Date: Monday, February 11, 2019
- Exam II Date: Monday, April 1, 2019
- Final Exam Date: Tuesday, April 30, 2019.

Grading System

Your final grade is a function of your performance on participation assignments, problem sets, midterm exams, and your final exam weighted in the following way:

<u>Assignment</u>	<u>Percentage of Final Grade</u>
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	30%
Problem Set Average	20%
CPA Average	10%

To determine a letter grade, I will calculate the points using the following formula, which you can rearrange to determine required exam scores for a specific letter grade (*if you need assistance doing this please stop by my office hours*):

$$\text{Final Grade} = 0.2 * (\text{Problem Set Average}) + 0.1 * (\text{CPA Average}) \\ + 0.2 * (\text{Exam 1}) + 0.2 * (\text{Exam 2}) + 0.3 * (\text{Final Exam})$$

Furthermore, the standard grading system will be used.

A	90-100%
B	80-89%
C	70-79%
D	60-69%
E	< 60%

Administrative Details

Office hours

I will have regular office hours on Mondays and Wednesdays from 12:00 - 1:30PM. If you can't make it during these hours, email me and we can setup a time that works for both of us. I can always answer brief questions via email, but I recommend seeing me in person for most issues.

Communication and Lectures

All the information about this course will be posted on Canvas (basic course materials, due dates, exam dates, problem sets). Please make sure you check Canvas frequently. You are responsible for everything that we discuss during class time. This means every concept, idea, exercise, and problems discussed have a fairly high probability of showing up in the exam. Your notes that you take during class will be your most valuable study tool. If you ever have to miss class, I recommend you borrow notes from your classmates and also check Canvas first, before you contact me with any additional questions.

Being Courteous

Be on time and if possible do not leave until class is dismissed. Late arrivals and early departures disrupt your fellow students and me. If nature calls so loudly that you must answer, please leave and return to the classroom quietly.

Do not carry on private conversations during class. This behavior shows disrespect for your classmates who would like to hear the lecture and it can have a negative impact on the learning experience of the entire class.

Cell Phones and Laptops

I expect professional behavior. Silence your cell phones. No texting during class. You can use your laptop to take notes. You cannot use your laptop for instant messaging, e-mailing, playing games, checking sports scores, shopping, and the like during class.

Excused Absences

The University Senate Rule on Excused Absences states that a student is entitled to an excused absence for the following reasons: serious illness; illness or death of family member; University-related trips; and major religious holidays. In each case, appropriate verification may be required. Students missing assignments due to an excused absence bear the responsibility of informing me about their excused absence within one week following the period of the excused absence (except where prior notification is required).

I will regularly confirm the authenticity of documentation used to verify excused absences.

Grievance Procedure

Anyone feeling that a dispute exists after the grading of an exam may submit a written grievance. The grievance should identify the item in dispute and provide arguments supporting the student's position. Grievances must be **submitted within two class periods following the return of the exam/assignments.**

Cheating

Academic integrity is valued by the University of Kentucky and its vast majority of students. University policy will be followed for any student caught cheating or plagiarizing and the penalty could include an E in the course and possible suspension or dismissal from UK.

Students with Disabilities or Accommodation Requests

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours or before/after class. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (DRC) at least one week before the first exam. The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859)

257-2754 and via email at drc@uky.edu. Their web address is <http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/>

TENTATIVE Course Outline

Below is a tentative course schedule. The chapters listed for each week are a rough guide for the course; if I think that we should spend more/less time on a specific topic then I will adjust it accordingly. Exam dates will not change. Although I am not currently planning on it, if I plan on making any substantial changes to the syllabus (i.e. removing a chapter), I will announce it in class and on Canvas as soon as I finalize that decision.

Week 1	Chapters 1 & 2
Week 2	Chapters 3 & 4
Week 3	<i>(No Class MLK Day)</i> Chapter 6
Week 4	Chapters 6 & 7
Week 5	Chapters 7-8 & Exam Review
Week 6	Midterm Exam 1 Chapter 9
Week 7	Chapters 9 & 10
Week 8	Chapters 10 & 11
Week 9	Chapter 13
Week 10	<i>(Spring Break)</i>
Week 11	Chapters 14 & 15
Week 12	Chapters 15- 16 & Exam Review
Week 13	Midterm Exam 2 Chapter 17
Week 14	Chapters 18 & 19
Week 15	Chapters 19 & 22
Week 16	Chapter 22 & Exam Review
April 30 th	Final Exam at 3:30PM