

Online ECON 4340/7340 – Introduction to Game Theory
Fall 2022
University of Missouri-Columbia
College of Arts and Science
Department of Economics

INSTRUCTOR

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TEACHING ASSISTANT

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COURSE DESCRIPTION

What is common between a football coach, a military general, and a car manufacturer? They all act in environments where they need to choose the best possible action, given their resources, and expecting what their counterparts will do – what kind of offensive moves the other team is going to use; where the ambushes are likely to be located; and what kind of features other car manufacturers are going to put in their vehicles, and how their cars are going to be priced. All such strategic interactions are brought together under the umbrella of game theory.

This course is an introduction to the topic aimed to equip you with a set of analytical tools to understand the behavior of interacting decision-makers – countries, consumers, firms, politicians. The basic assumptions of game theory are that decision-makers pursue well-defined objectives and take into account their knowledge or expectations of other decision-makers' behavior. The course introduces the basic theory, emphasizing the concepts. A variety of applications will be discussed, mostly from economics, business, and political science.

The prerequisites for this course are Economics 3251 or Economics 4351.

LEARNING OBJECTIVES

After completing the entire course, you will be able to:

- Understand and explain fundamental concepts of non-cooperative game theory
- Apply solution concepts to examples of games, and to state and explain them precisely
- Identify strategic situations and present them as games

REQUIRED TEXT

- Avinash Dixit, Susan Skeath, and David MacAdams, *Games of Strategy*, 5th edition.

Since this course is part of University of Missouri AutoAccess program, you already have access to the digital copy of the required text. You have a week from the start of the class to opt out of purchasing the ebook and receive a refund (\$48). However, keep in mind that a physical copy of the textbook, which you can purchase at retailers like Amazon, might cost you twice more.

ONLINE COURSE ACCESS

You may access the course via <https://canvas.umsystem.edu>. Enter your PawPrint to login. If you are having any technical difficulties, please contact the University of Missouri Tech Support via phone 573-882-5000 or e-mail techsupport@missouri.edu.

TECHNICAL SKILLS REQUIRED

This class is a semester based online course. You are expected to have minimal technical skills such as using Canvas, scanning and uploading documents. Having reliable access to the Internet is necessary.

VIRTUAL OFFICE HOURS

You can reach me or my TA via Zoom during the scheduled office hours (see the contact information). To learn more about Zoom, follow the link to

<https://teachingtools.umsystem.edu/support/solutions/articles/11000083175-getting-started-zoom-quick-start-guide>.

ALL STUDENTS TAKE EXAMS AT THE SAME TIME

All students take the exams through Canvas. Midterm 1 is on September 27, Midterm 2 on October 25, and the final on December 13 (see the weekly schedule). All three exams start at 5:00pm Central Time. Only calculators and your own notes from watching the videos and reading the textbook are allowed on the exams.

If you have a conflict that cannot be avoided (e.g., you are taking a class that meets every Tuesday from 5pm to 6:15pm, or you are in another continent and 5pm Central Time translates to 2am your local time), email me to explain the circumstances and to request a different time. Please do so at least one week before the exam.

EXPECTATIONS

- **What to expect from a technology-enhanced course:** This course is designed to meet virtually. It is essential that you access the course site Monday through Friday to read announcements, participate in class discussions, view lectures, submit homework assignments, and take exams.
- **What the instructor, the TA and your peers expect from you:** All general class correspondence, especially questions about course material, should be submitted to the Discussion Board. This will require a team effort, with respect and help for each other.
- **What you may expect from the instructor and the TA:** We will monitor and facilitate class discussions, respond to questions within 24 hours, provide timely feedback on homework assignments and exams, and help build a learning community.

PANOPTO INFORMATION

This course uses Panopto to deliver video recordings to you in a secure environment through Canvas. You may watch videos online, or download them for off-line viewing on your computer, smartphone, or media player. The Curators of the University of Missouri and your instructor jointly copyright these recordings. Posting them to another website, including YouTube, Facebook, BlipTV, or any other site without express, written permission may result in disciplinary action and possible civil prosecution.

WEEKLY SCHEDULE AND ASSIGNMENTS

Week	Unit	Tasks
1	Basic Ideas and Examples; How to Think about Strategic Games	<ol style="list-style-type: none"> 1. Familiarize yourself with the syllabus. 2. Read Chapter 1 from the textbook. Chapter 1 offers some simple examples of strategic games and strategic thinking. 3. Read Chapter 2. Chapter 2 classifies games along several key dimensions of different strategic matters or concepts.
2	Games with Sequential Moves	<ol style="list-style-type: none"> 1. Read Chapter 3. 2. Watch videos 3.1-3.6. 3. At this point you have all the information needed for Homework 1; start working on it immediately, as the due date is next Tuesday.
3	Simultaneous-Move Games: Discrete Strategies	<ol style="list-style-type: none"> 1. Submit Homework 1 by 5:00pm Central Time on Tuesday. 2. Start reading Chapter 4. 3. Watch videos 4.1-4.8. 4. You have all the information needed for Questions 1-4 of Homework 2.
4	Simultaneous-Move Games: Discrete Strategies (continued)	<ol style="list-style-type: none"> 1. Finish reading Chapter 4. 2. Watch videos 4.9-4.14. 3. You have all the information needed to complete Homework 2.
5	Simultaneous-Move Games: Continuous Strategies	<ol style="list-style-type: none"> 1. Submit Homework 2 by 5:00pm Central Time on Tuesday. 2. Read Chapter 5. 3. Watch videos 5.0-5.5. 4. You have all the information needed for Question 1 of Homework 3. 5. Watch videos M1.1-M1.3, a brief review for Midterm 1 that will be based on Chapters 3, 4 and 5.
6	Combining Sequential and Simultaneous Moves	<ol style="list-style-type: none"> 1. Take Midterm 1 on Tuesday, 5:00pm – 6:30pm Central Time. 2. Read Chapter 6. 3. Watch videos 6.1-6.9. 4. You have all the information needed to complete Homework 3.
7	Simultaneous-Move Games: Mixed Strategies	<ol style="list-style-type: none"> 1. Submit Homework 3 by 5:00pm Central Time on Tuesday. 2. Start reading Chapter 7. 3. Watch videos 7.1-7.7. 4. Start Homework 4 with Question 2, as it might help you with Question 1.

8	Simultaneous-Move Games: Mixed Strategies (continued)	<ol style="list-style-type: none"> 1. Finish reading Chapter 7. 2. Watch videos 7.8-7.11. 3. You have all the information needed to complete Homework 4.
9	Uncertainty and Information	<ol style="list-style-type: none"> 1. Submit Homework 4 by 5:00pm Central Time on Tuesday. 2. Read Chapter 9. 3. Watch videos 9.1-9.5. 4. You have all the information needed for Questions 1 and 2 of Homework 5. 5. Watch videos M2.1-M2.3, a brief review for Midterm 2 that will be based on Chapters 6, 7 and 9.
10	Strategic Moves	<ol style="list-style-type: none"> 1. Take Midterm 2 on Tuesday, 5:00pm – 6:30pm Central Time. 2. Read Chapter 8. 3. Watch videos 8.1-8.6. 4. You have all the information needed to complete Homework 5.
11	The Prisoners' Dilemma and Repeated Games	<ol style="list-style-type: none"> 1. Submit Homework 5 by 5:00pm Central Time on Tuesday. 2. Read Chapter 10. 3. Watch videos 10.1-10.4. 4. You have all the information needed for Questions 1-3 of Homework 6.
12	Collective-Action Games	<ol style="list-style-type: none"> 1. Read Chapter 11. 2. Watch videos 11.1-11.9. 3. You have all the information needed to complete Homework 6.
13	Strategy and Voting	<ol style="list-style-type: none"> 1. Submit Homework 6 by 5:00pm Central Time on Tuesday. 2. Read Chapter 16. 3. Watch videos 16.1-16.9. 4. You have all the information needed for Questions 1-3 of Homework 7.
14	Bargaining	<ol style="list-style-type: none"> 1. Read Chapter 17. 2. Watch videos 17.1-17.5. 3. You have all the information needed to complete Homework 7.
15	Review for the Final Exam	<ol style="list-style-type: none"> 1. Submit Homework 7 by 5:00pm Central Time on Tuesday. 2. Watch videos F.1-F.5, a quick review for the final exam that will be based on Chapters 8, 10, 11, 16 and 17.
16	Final Exam	<ol style="list-style-type: none"> 1. Take the final on Tuesday, 5:00pm – 7:00pm Central Time.

ADVICE (HOW TO BE SUCCESSFUL)

- **Watch the videos:** If, for whatever reason, you have to choose between watching the videos and reading the textbook, you should go for the videos. There are a few videos that cover material that is not in the textbook, e.g. the minimax method for zero-sum games (video 4.8) or the linear city model (videos 5.4 & 5.5). Sometimes I use a different approach than the textbook. For example, I employ calculus in Chapter 5 (videos 5.0-5.5) and then later in Chapter 11 (videos 11.8 & 11.9), while the textbook avoids the use of derivatives to find an optimal value.
- **Read the textbook:** Turn to the textbook for more examples, or when you feel like things unravel too fast in the videos. Note that not all sections of the textbook chapters are relevant for the course. For example, you can safely skip Sections 2-4 in Chapter 5, Sections 1, 6 and 7 in Chapter 9, Sections 3-7 in Chapter 10, Sections 4 and 5 in Chapter 11, Sections 3 and 5 in Chapter 16, and Sections 2, 4-7 in Chapter 17.
- **Practice, practice, practice!** The exercises in each chapter of the textbook are split into two sets, solved and unsolved. The solutions to the solved sets for all chapters can be obtained from the publisher's website. While I occasionally assign exercises from the unsolved sets, you can use exercises from the solved sets to practice.
- **Stay ahead of the schedule:** You do not need to wait until the due date to submit your homework assignment. Stay a few days or a week ahead of the schedule. This will allow more time to prepare for the exams.
- **Do not wait until the last day to start working on a homework:** All homework assignments are due on Tuesdays at 5:00pm Central Time. If you start working on a homework on the day it is due, you may (and will, on many occasions) run out of time – some of the material will be difficult, you may get distracted by other tasks and requirements, etc.
- **Never be late with electronic submissions:** All homework assignments and exams are submitted electronically. Once the due date and time have passed – even by 1 second – the link to submit disappears.

EVALUATION AND GRADING

The course will be graded on the basis of the homework assignments (15%, the lowest homework score will be dropped), the two midterm exams (25% each) and the final exam (35%). Letter grades will be mapped in the following way: A+ range is from 100% to 97.00%, A from <97.00% to 93.00%, A- from <93.00% to 90.00%, B+ from <90.00% to 87.00%, B from <87.00% to 83.00%, B- from <83.00% to 80.00%, C+ from <80.00% to 77.00%, C from <77.00% to 73.00%, C- from <73.00% to 70.00%, D+ from <70.00% to 67.00%, D from <67.00% to 63.00%, D- from <63.00% to 60.00%, F below that.

LATE WORK POLICY

Since this is an online course, no late assignments (homeworks and exams) will be accepted without University and Instructor approved documentation. If you have circumstances that affect your ability to complete an assignment, please contact me at least 3 days in advance of the due date.

NETIQUETTE

In an online classroom, our primary means of communication is written. The written language has many advantages: more opportunity for reasoned thought, more ability to go in-depth, and more time to think

through an issue before posting a comment on the Discussion Board forum. However, written communication also has certain disadvantages, such as lack of the face-to-face signaling that occurs through body language, intonation, pausing, facial expressions, and gestures. As a result, please be aware of the possibility of miscommunication and compose your comments in a positive, supportive, and constructive manner.

ACADEMIC INTEGRITY

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.

STUDENTS WITH DISABILITIES

If you anticipate barriers related to the format of requirements of this course, or if you have emergency medical information to share with me, please let me know as soon as possible. If disability related accommodations are necessary (for example, a note taker, extended time on exams), please establish an accommodation plan with the Disability Center (<http://disabilitycenter.missouri.edu/>), S5 Memorial Union, 573-882-4696, and then notify me of your eligibility for reasonable accommodations.

INTELLECTUAL PLURALISM

The University community welcomes intellectual diversity and respects student rights. Students who have questions or concerns regarding the atmosphere in this class (including respect for diverse opinions) may contact the departmental chair or divisional director, the Office of Academic Integrity (<http://oai.missouri.edu/>), or the MU Equity Office (<http://equity.missouri.edu/>). All students will have the opportunity to submit an anonymous evaluation of the instructor at the end of the course.

NONDISCRIMINATION POLICY

The University of Missouri is an Equal Opportunity/ Affirmative Action institution and does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, age, disability, or status as a protected veteran.