

ECON 314: Game Theory

Spring 2022

(Last updated January 24, 2022; syllabus is subject to change)

Instructor: Professor Eren Bilen

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Phone: 717-254-8162

Office Hours: Monday 7:00-8:00pm (Zoom)

Tuesday 1:45-2:45pm (in-person)

Friday 10:00-11:00am (in-person)

or by appointment

QRA: Annie Le, lemi@dickinson.edu

Office Hours: Tuesday 7:00-8:00pm (Zoom)

Sunday 5:00-6:00pm (Zoom)

Class: Althouse Hall 110

Tuesday and Thursday

9:00-10:15am

Course Materials

- Games of Strategy, 5th edition by Avinash Dixit and Susan Skeath (required); earlier editions are fine, provided that you keep track of changes between editions.
- Course webpage: [Moodle](#)

Course Goals

Game theory is a branch of mathematics and economics devoted to the study of strategic situations. This course presents the main ideas of game theory and shows how they can be used to understand decision making in business, politics, and other real world environments. Warning! Game theory is a theoretical subject. Although it covers issues of relevance to everyday life, you should be prepared to accept a higher level of abstraction than is commonly encountered in other classes.

Here are several Sveriges Riksbank Prizes in Economic Sciences in Memory of Alfred Nobel for strategic decision-making:

- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1994 was awarded jointly to John C. Harsanyi, John F. Nash Jr. and Reinhard Selten for their pioneering analysis of equilibria in the theory of non-cooperative games.

<https://www.nobelprize.org/prizes/economic-sciences/1994/summary>

- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2001 was awarded jointly to George A. Akerlof, A. Michael Spence and Joseph E. Stiglitz for their analyses of markets with asymmetric information.
<https://www.nobelprize.org/prizes/economic-sciences/2001/summary>
- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2005 was awarded jointly to Robert J. Aumann and Thomas C. Schelling for having enhanced our understanding of conflict and cooperation through game-theory analysis.
<https://www.nobelprize.org/prizes/economic-sciences/2005/summary>
- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2007 was awarded jointly to Leonid Hurwics, Eric S. Maskin and Roger B. Myerson for having laid the foundations of mechanism design theory.
<https://www.nobelprize.org/prizes/economic-sciences/2007/summary>
- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2012 was awarded jointly to Alvin E. Roth and Lloyd S. Shapley for the theory of stable allocations and the practice of market design.
<https://www.nobelprize.org/prizes/economic-sciences/2012/summary>
- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2020 was awarded jointly to Paul R. Milgrom and Robert B. Wilson for improvements to auction theory and inventions of new auction formats.
<https://www.nobelprize.org/prizes/economic-sciences/2020/summary>

As you progress through the course, you will solve problems, play games and learn to make decisions in strategic situations. The emphasis in this course is on reasoning and understanding, not memorizing. In order to better illustrate the concepts of the course, we will often play games with each other in class. The methods we learn will improve your analytical skills.

A student who successfully completes this course should be able to do the following:

- Apply game theoretic solution concepts, including Nash Equilibrium, Mixed Strategy Equilibrium, and Subgame Perfect Equilibrium to economic situations and know when these game theoretic solutions make accurate predictions and give effective advice.
- Model economics and business topics covered by media outlets or in other courses using the formal tools that game theory provides.

Course Policies

Attendance Policy: This course will be taught in person in Althouse Hall 110. Students are expected to attend all in-class meetings, which occur on Tuesdays and Thursdays from 9:00-10:15am ET. While I will not take formal attendance, it is important for you to attend in class meetings and take notes. If you will be unable

to attend a class meeting for any health-related issues or other emergencies, please contact me beforehand so that arrangements can be made.

Use of Laptops, Tablets, and Phones: Laptops and tablets are permitted for note-taking during this course. Research says laptops are not ideal for learning, but I am not against the use of laptops for note-taking purposes. In exchange for trusting you to use these devices, I ask that you not use them as distractions. I maintain the right to change this policy for individual students or for everyone if these tools become a problem during class. Phones are not permitted and should be put away, with the exception that if they are used for in-class games.

Grading: Your course grade is based on two closed-book midterms, one final (closed-book, comprehensive), six homeworks, and a presentation. More information on presentations will be posted later in the semester.

Homework (20%):	Due dates TBA
2 Midterms (40%):	March 3 & April 5
Final (25%):	May 9 @2pm
Presentation (15%):	Week 16, topics due April 8

Extra credit: You will have opportunities to earn bonus points during the course by participating in in-class games. Additionally, I will drop your lowest homework.

The following scale will be used to determine your final grade:

Score	Letter	GPA	Score	Letter	GPA
$93 \geq x$	A	4.0	$73 \leq x < 77$	C	2.0
$90 \leq x < 93$	A-	3.7	$70 \leq x < 73$	C-	1.7
$87 \leq x < 90$	B+	3.3	$67 \leq x < 70$	D+	1.3
$83 \leq x < 87$	B	3.0	$63 \leq x < 67$	D	1.0
$80 \leq x < 83$	B-	2.7	$60 \leq x < 63$	D-	0.7
$77 \leq x < 80$	C+	2.3	$x < 60$	F	0.0

Make-up Exams: There will be no make-up exams unless a student must be away from campus on university business or due to an emergency. The student must provide documentation.

Homework: Homework will be assigned in Moodle. Due dates will be provided for all assignments. Solutions will be made available in Moodle after the deadline. You may discuss homework problems with others, but your solutions must be written up individually.

Homework assignments must be turned in person at the beginning of class as a stapled physical copy. Late assignments will not be accepted without a signed medical excuse. If you are unable to submit an assignment because of

a personal or health emergency that arises during the week, you must contact me prior to the submission time to discuss arrangements for completing the assignment. Your work will be scored and returned in class.

Getting Help

Office Hours: I will be holding office hours in-office and in Zoom—please see Moodle for the Zoom link that will be used throughout the semester. My office hours are Monday 7:00 – 8:00pm (Zoom), Tuesday 1:45–2:45pm (in-person), and Friday 10:00 – 11:00am (in-person). I am also available by appointment. You can access my Zoom room using [this link](#) which is also posted on Moodle.

Quantitative Reasoning Associate: This semester, we are fortunate to have a Quantitative Reasoning Associate (QRA) working with us. A QRA is a fellow student who will be helping us as a course facilitator and student mentor. This semester, the QRA for our course is Annie Le. She will be holding office hours on Tuesday 7:00–8:00pm and Sunday 5:00-6:00pm both on Zoom. You can use [this link](#) to access Annie’s Zoom room, also posted on Moodle.

Quantitative Reasoning Center

Dickinson College provides additional support for students taking courses with quantitative content across the curriculum through the Quantitative Reasoning (QR) Center. For the fall 2021 semester, the QR Center will offer tutoring for our course, in addition to general quantitative support. You are strongly encouraged to make an appointment with them. [Click here](#) to access the QR Center webpage.

Please visit dickinson.mywconline.com to make an appointment. Then, access the drop-down menu under “limit to” at the top of the scheduler and select MATH 121. This will restrict the tutor list and schedule to only those tutors approved for this course. When you make your appointment, please also paste or upload your assignment and any work that you have done.

Other Important Information

Referencing the Work of Others: When submitting your work, you must follow common-sense ground rules. External sources may only be used to improve your own understanding of the material. When you write your solutions, you should do it on your own without the direct help of any external sources, and certainly should not write down anything that you do not understand. If you do use external references, please be sure to cite them. Failure to cite references will be treated as academic dishonesty.

Respect for Intellectual Property: It is important that you be aware of and respect the intellectual property rights of others. Unless explicitly stated otherwise, all materials available on the internet, in libraries, and elsewhere are considered intel-

lectual property and can only be used with the permission of the owner. Specifically, with regards to this class, you should not share any of the course materials, including homework answer keys, with others, even after the completion of the course.

Statement on Disabilities: Dickinson values diverse types of learners and is committed to ensuring that each student is afforded equitable access to participate in all learning experiences. If you have (or think you may have) a learning difference or a disability – including a mental health, medical, or physical impairment that would hinder your access to learning or demonstrating knowledge in this class, please contact Access and Disability Services (ADS). They will confidentially explain the accommodation request process and the type of documentation that Dean and Director Marni Jones will need to determine your eligibility for reasonable accommodations. To learn more about available supports, go to www.dickinson.edu/ADS, email access@dickinson.edu, call (717) 245-1734, or go to the ADS office in Room 005 of Old West, Lower Level (aka “the OWLL”).

If you have already been granted accommodations at Dickinson, please follow the guidance at www.dickinson.edu/AccessPlan for disclosing the accommodations for which you are eligible and scheduling a meeting with me as soon as possible so that we can discuss your accommodations and finalize your Access Plan. If test proctoring will be needed from ADS, remember that we will need to complete your Access Plan in time to give them at least one weeks advance notice.

SOAR: Academic Success Support: Students can find a wealth of strategic guidance by going to www.dickinson.edu/SOAR. This website for SOAR (Strategies, Organization, and Achievement Resources) includes apps, tips, and other resources related to time management, study skills, memory strategies, note-taking, test-taking, and more. You will also find information aimed to help students “SOAR Through Academic Challenges,” as well as a schedule of academic success workshops offered through Academic Advising. If you would like to request one-on-one assistance with developing a strategy for a manageable and academically successful semester, email SOAR@dickinson.edu.

Course Outline: Below is a list of topics to be covered in this course. There may be adjustments on the list during the semester depending on progress made in class; however test dates will not change.

Date	Topic	Chapter/Readings
Week 1	Introduction, Math Quiz, Elements of a Game	Chapter 1-2
Week 2-3	Sequential Move Games	Chapter 3
Week 4-5 (HW1 due TBA)	Simultaneous Move Games	Chapter 4-5
Week 6 (HW2 due TBA)	Dynamic Games	Chapter 6
March 3	Test 1	
Week 7	Mixed Strategies	Chapter 7
Week 8	<i>Spring break</i>	
Week 9-10 (HW3 due TBA)	Incomplete Information Games	Chapter 8-9
Week 11 (HW4 due TBA)	Repeated Games	Chapter 10
April 5	Test 2	
Week 12-13	Auctions	Chapter 15
Week 14 (HW5 due TBA)	Bargaining	Chapter 17
Week 15 (HW6 due TBA)	Presentations	
May 9, Tuesday @2pm	Final Exam	

Important Dates for the Spring 2022 Semester

Last Day to Add/Drop or Change to/from Pass/Fail	Friday, January 28
Spring Vacation	5 pm, Friday, March 11 thru 8 am, Monday, March 21
Public lecture: Luis von Ahn, Co-founder of Duolingo	Tuesday@5pm, March 22 in ATS
Course Request Period for Fall 2022 Semester	Monday, March 28 thru Wednesday, March 30
Last Day to Withdraw from a Course with a "W" grade	Friday, April 22
Classes End	Friday, Friday, May 6
Reading Period Days	May 7, 8, 11, 14, 15