



ECON 392: Strategic Situations and Welfare Economics
Winter 2022 – 1:00 – 2:20 MW – RCH 110

Instructor Information

Instructor: Ahmet OZKARDAS

Office: PAS 1049

Office Hours: After each class (MW 2:30 – 3:30) or by appointment (via Teams for online teaching period).

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1. Course Objectives

Many economic decisions are made in circumstances where there are no competitive markets. This course introduces students to individual and group choices in such settings. It covers how to model such settings as "games" in both the extensive and strategic form and introduces the key equilibrium concepts associated with these models. An introduction to considerations in group decision-making via cooperative game theory is provided in the last part of the course.

This course is a required course for those students doing the Intensive Specialization. As such, we will be developing the mathematical foundations of game theory and social choice. Strong mathematical skills are required.

2. Learning Outcomes:

By the end of the course, a student should be able to:

1. Identify the strategic situations and distinguish a game situation from a pure individual's decision problem.
2. Describe the simultaneous games using payoff matrix and define the solution concepts using the dominant strategy equilibrium and pure and mixed strategy Nash equilibrium.
3. Describe the sequential games using the game trees and use the backward induction to solve such games.
4. Analyze the oligopolistic market systems by using game theoretical tools.
5. Apply well-founded strategies in bargaining situations using Nash and Rubinstein's bargaining solution concepts.
6. Define voting games and apply Impossibility Theorem and Condorcet Paradox

3. Course Materials

3.1. Recommended Textbook

This course will be based on

- M. J. Osborne, *An Introduction to Game Theory*, New York: Oxford University Press, 2004

However, the topics are all covered by standard, introductory and intermediate game theory textbooks. You may want to read through the relevant sections of some such book because (a) it can provide a different perspective on the material presented, (b) it has more space devoted to discussions and examples, and (c) it serves as a source of exercises and practice problems. Here is a list of such textbooks:

- Fiona Carmichael, *A Guide to Game Theory*, Pearson Education, 2005
- J. Watson, *Strategy: An Introduction to Game Theory*, W. W. Norton & Company, 3rd edition, 2013
- E. Rasmusen, *Games and Information: An Introduction to Game Theory*, Wiley-Blackwell, 4th edition, 2006
- H.S. Bierman, L. Fernandez, *Game Theory with Economic Application, Second Edition*, Addison Wesley, 1998.

3.2. Readings Available on LEARN:

Lecture slides, exercises, and solutions or answers will be posted on LEARN. It is your responsibility to download all materials uploaded on LEARN. When the classes are online, lecture videos will be uploaded on LEARN weekly.

4. Course Requirements and Assessment

Assessment	Weighting
<i>Test 1</i>	18%
<i>Test 2</i>	18%
<i>Test 3</i>	18%
<i>Test 4</i>	18%
<i>Final Exam</i>	28%

4.1. Tests:

Four tests are to be completed during the whole term through LEARN. You will have access to each test for 24 hours (from 12:01 am to 11:59 pm), and once you start, you will have only one attempt and a limited time. There will be multiple-choice questions as well as written response questions. Details about the coverage of the tests will be announced on LEARN.

Due date	
<i>Test 1</i>	January 28, Friday, 12:01 am – 11:59 pm
<i>Test 2</i>	February 18, Friday, 12:01 am – 11:59 pm
<i>Test 3</i>	March 18, Friday, 12:01 am – 11:59 pm

Test 4 | April 4, Monday, 12:01 am – 11:59 pm

4.2. Final Exam:

The final exam is cumulative and will test all the material in the course. You will have access to the final exam for 24 hours, and once you start, you will have only one attempt and a limited time. Note that the final will not be rescheduled under any circumstances if all term tests have been missed. You should by now be familiar with the deferred final exam policy of the department.

<i>Due date</i>	
<i>Final Exam</i>	TBA

4.3. Policy on Academic Integrity and Honesty

The University of Waterloo subscribes to the strictest interpretation of academic integrity. Faculty members and students bear joint responsibility in assuring that cheating on any examination is not tolerated. Students who engage in academic dishonesty will be subject to disciplinary action under [Policy 71](#). Course assessments such as questions on exams are protected by copyright. Reproduction or dissemination of exams, quizzes, or any assessments' contents or format in any manner (for example, posting/e-mailing/texting/sharing the content and questions with other students) is strictly prohibited. Students who are enrolled in ECON 392 agree to the following academic honesty and integrity statement:

By taking this course, every student affirms his/her/their agreement to the following statements:

- I confirm that I will keep the content of the examinations and other assessments confidential. I will not post questions, solutions, or content to third-party websites or transfer it to other individuals.
- I confirm that I will not receive any unauthorized assistance in preparing for or writing examinations.
- I confirm that I will not access the Internet or any other unauthorized resource in writing the assessments, such as exams.
- I understand that I am responsible for being honest and ethical as [Policy 71](#).
- I understand that there is no group work or cooperation involved in the assessments in this course. The assessments such as term tests and final exam will be completed by my efforts, and I will not collaborate with any other person for ideas or answers.

4.4. Upload Policy on Exams

All due date times are for Waterloo. Some exam questions will be multiple-choice, multiple select, or true/false format. Some other questions will require you to show your work and upload it. The uploaded solutions to exams must be handwritten and scanned. Typed solutions will not be accepted for uploads. You will need to write your solutions on paper, write your name on each page, and scan and submit the question number (do not write the questions). To ensure your scanned document is clear, the use of Microsoft Office Lens, which can be installed on your phone

or iPad as an app (free of charge), is recommended. It is your responsibility to make sure that your handwriting is easy to read for marking purposes; no marks will be assigned if the handwriting is not easy to read.

4.5. Policy on Missed Exams

There will be no make-up exams. No additional assignments or work will be assigned to improve the marks. The weight of a missed test for which a VIF is accepted will be shifted to the final exam. If you happen to be sick for all term tests, you should consider dropping the course. The UW verification of illness form must be obtained on the exam day and submitted within three days of the missed exam date. Any medical notes submitted after three days of a missed deadline or a missed exam will not be accepted. Medical notes brought up at the end of the term to cover missed tests will not be accepted.

The instructor has no new exam arrangements if you miss the final exam. You will need to apply for consideration of a deferred exam through the office of the Department of Economics. If you have compelling and verifiable evidence that you cannot write the final exam at the scheduled time, you must follow this procedure to apply for a deferred exam. Please check the [Deferred Final Exam Policy](#) of the department.

5. Course Modification Warning

The instructor and University reserve the right to modify elements of the course during the term. The instructor might need to change course components due to the issues with using technology and uploading files to LEARN. The University may change the dates and deadlines for any courses in extreme circumstances. If either modification becomes necessary, reasonable notice and communication with the students will be given with an explanation and the opportunity to comment on changes. It is the student's responsibility to check their University of Waterloo e-mail and course website on LEARN daily during the term and to note any changes.

6. Office Hours and Contacting the Instructor/TA

When sending an e-mail to me, please use your official University of Waterloo account and have ECON 392 in the subject line. It is generally a good idea to also have a signature line that includes your full name and student ID. Please treat e-mail correspondence as a somewhat formal venue of communication. Before sending an e-mail, please check the "Discussions" on LEARN.

If you need a virtual meeting, please ask for an appointment. The instructor or TA will give you an appointment (approximately 30 min per student). Please send your questions with your e-mail while asking for an appointment. This will reduce the unnecessary time lost during the virtual meeting. Please be clear about your questions. The instructor/TA cannot re-explain the whole topic; however, they can help you understand the topic's unclear points.

7. Weekly Course Schedule

Weeks	Dates	Topics
Week 1	Jan 5 – 8	0. Syllabus 1. What is Game Theory (video)
Week 2	Jan 9 – 15	2. Game Forms (video) 3. Strategic Form (video)
Week 3	Jan 16 – 22	4. Dominance (video) 5. Nash Equilibrium (video)
Week 4	Jan 23 – 29	6. Mixed Strategies 7. NE in Mixed Strategies
<i>Readings for topics 1 – 7: Osborne Chapters 2, 4.</i>		
Test 1 (Topics 1 – 5), Jan 28, Friday, 12:01 am – 11:59 pm		
Week 5	Jan 30 – Feb 5	8. NE in Continuous Action Space
Week 6	Feb 6 – 12	9. Cournot Competition 10. Bertrand Competition
<i>Readings for topics 1 – 10: Osborne Chapters 3</i>		
Test 2 (Topics 6 – 10), Feb 18, Friday, 12:01 am – 11:59 pm		
Week 7	Feb 13 – 19	11. Extensive Games 12. Extensive vs. Strategic Games
Reading Week: Feb 19 – 27		
Week 8	Feb 27 – Mar 5	13. Subgame Perfect Equilibrium
Week 9	Mar 6 – 12	14. Stackelberg Competition
<i>Readings for topics 11 – 14: Osborne Chapters 5,6,7.</i>		
Test 3 (Topics 11 – 14), Mar 18, Friday, 12:01 am – 11:59 pm		
Week 10	Mar 13 – 19	15. Nash Bargaining
Week 11	Mar 20 – 26	16. Finite Horizon Sequential Bargaining 17. Infinite Horizon Sequential Bargaining
Week 12	Mar 27 – Apr 2	18. Voting Games
<i>Readings for topics 14 – 18: Osborne Chapters 8,16</i>		
Test 4 (Topics 15 – 18), Apr 4, Monday, 12:01 am – 11:59 pm		
Week 13	Apr 3 – 5	Final review
Final Exam (Topics 1 – 20), TBD		

8. Institutional-required statements for undergraduate course outlines approved by Senate Undergraduate Council.

8.1. Economics Department Deferred Final Exam Policy

Deferred Final Exam Policy found at [Deferred Final Exam Policy](#)

8.2. Cross-listed course

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

8.3. Academic Integrity

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the [UWaterloo Academic Integrity](#) webpage and the [Arts Academic Integrity](#) webpage for more information.

Discipline: A student is expected to know what constitutes academic integrity, avoid committing academic offences, and take responsibility for their actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offences and types of penalties, students should refer to [Policy 71 - Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

Grievance: A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. [Read Policy 70 - Student Petitions and Grievances](#), Section 4. When in doubt, please be certain to contact the department's administrative assistant, who will provide further assistance.

Appeals: A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes they have a ground for an appeal should refer to [Policy 72 - Student Appeals](#).

8.4. Accommodation for Students with Disabilities

Note for students with disabilities: [The AccessAbility Services office](#), located on the first floor of the Needles Hall extension (1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

8.5. Intellectual Property

Students should be aware that this course contains the intellectual property of their instructor, TA, or the University of Waterloo.

Intellectual property includes items such as:

- The lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission violates intellectual property rights. For this reason, it is necessary to ask the instructor, TA or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow the distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given consent).

8.6. Chosen/Preferred First Name

Do you want professors and interviewers to call you by a different first name? Take a minute now to verify or tell us your chosen/preferred first name by logging into [WatIAM](#).

Why? Starting in winter 2020, your chosen/preferred first name listed in WatIAM will be used broadly across campus (e.g., LEARN, Quest, WaterlooWorks, WatCard, etc.). Note: Your legal first name will always be used on certain official documents. For more details, visit [Updating Personal Information](#).

Important notes

- If you included a preferred name on your OUAC application, it would be used as your chosen/preferred name unless you make a change now.
- If you don't provide a chosen/preferred name, your legal first name will continue to be used.

8.7. Mental Health Support

All of us need a support system. The faculty and staff in Arts encourage students to seek out mental health support if they are needed.

On-Campus

Due to COVID-19 and campus closures, services are available only online or by phone.

- Counselling Services: counselling.services@uwaterloo.ca / 519-888-4567 ext. 32655
- **MATES**: one-to-one peer support program offered by the Waterloo Undergraduate Student Association (WUSA) and Counselling Services

Off-campus, 24/7

- **Good2Talk**: Free, confidential helpline for post-secondary students. Phone: 1-866-925-5454
- Grand River Hospital: Emergency care for the mental health crisis. Phone: 519-749-4300 ext. 6880
- **Here 24/7**: Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- **OK2BME**: the support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online on the Faculty of Arts [website](#)

Download [UWaterloo and regional mental health resources \(PDF\)](#)

Download the [WatSafe app](#) to your phone to quickly access mental health support information.

8.8. Student Notice of Recording (Live or recorded video conferencing on WebEx, Microsoft Teams, etc.)

Activities for this course might involve recording, in partial fulfillment of the course learning outcomes. You might receive notification of recording via the Learning Management System (LEARN), a message from your course instructor, course syllabus/website, or other means. Some technologies may also provide a recording indicator. Images, audio, text/chat messages that have been recorded may be used or made available by the University to the instructor,

Econ 211 students, TAs and tutorial leaders for the purpose of review. Recordings will be managed according to the University records classification scheme, WatClass, and will be securely destroyed when no longer needed by the University. Your personal information is protected in accordance with the [Freedom of Information and Protection of Privacy Act](#), as well as University policies and guidelines and may be subject to disclosure where required by law.

The University will use reasonable means to protect the security and confidentiality of the recorded information but cannot provide a guarantee of such due to factors beyond the University's control, such as recordings being forwarded, copied, intercepted, circulated, disclosed, or stored without the University's knowledge or permission, or the introduction of malware into the computer system which could potentially damage or disrupt the computer, networks, and security settings. The University is not responsible for connectivity/technical

difficulties or loss of data associated with your hardware, software, or Internet connection.

By engaging in course activities that involve recording, you are consenting to the use of your appearance, image, text/chat messaging, and voice and/or likeness in the manner and under the conditions specified herein. (In the case of a live stream event, if you choose not to have your image or audio recorded, you may disable [the audio and video functionality](#) (see: Student privacy during live events). Instructions to participate using a pseudonym instead of your real name are included where the feature exists; however, you must disclose the pseudonym to your instructor in advance in order to facilitate class participation.) If you choose not to be recorded, this notice serves as a confirmation of your understanding that you can watch the recordings later and ask your questions via e-mail.

You are not permitted to disclose the link to/URL of an event or an event session recording or copies of the recording to anyone for any reason. Recordings are available only to authorized individuals who have been directly provided with the above instructions/link for their use. Recordings for personal use, required to facilitate your learning and preparation of personal course/lecture notes, should not be shared with others without the permission of the instructor or event coordinator. Review [the University's guidelines for faculty, staff and students entering relationships with external organizations](#) offering access to course materials for more information on your obligations with respect to keeping copies of course materials. For more information about accessibility, connect with [AccessAbility Services](#).

9. Territorial Acknowledgement

We acknowledge that we are living and working on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabe and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes ten kilometres on each side of the Grand River.

For more information about the purpose of territorial acknowledgements, please see the [CAUT Guide to Acknowledging Traditional Territory](#).

10. Academic freedom at the University of Waterloo

[Policy 33, Ethical Behaviour](#) states, as one of its general principles (Section 1), "The University supports academic freedom for all members of the University community. Academic freedom carries with it the duty to use that freedom in a manner consistent with the scholarly obligation to base teaching and research on an honest and ethical quest for knowledge. In the context of this policy, 'academic freedom' refers to academic activities, including teaching and scholarship, as is articulated in the principles set out in the Memorandum of Agreement between the FAUW and the University of Waterloo, 1998 (Article 6). The academic environment which fosters free debate may from time to time include the presentation or discussion of unpopular opinions or controversial material. Such material shall be dealt with as openly, respectfully and sensitively as

possible." This definition is repeated in Policies 70 and 71 and the Memorandum of Agreement, Section 6.