

ECON310 – GAME THEORY – SPRING 2021
SYLLABUS
FACULTY OF ARTS AND SOCIAL SCIENCES – SABANCI UNIVERSITY

COURSE INFORMATION:

Instructor: Mehmet Barlo

Office Hours: By appointment over Zoom.

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Teaching Assistant: Gizem Kılıçgedik (gkilicgedik@sabanciuniv.edu)

web-page: SU Course

Class: Tuesday – 4:40 pm - 5:30 pm (Zoom meeting)

Recitation: Tuesday – 1:40 pm - 2:30 pm (Zoom meeting)

COURSE OBJECTIVES

The goal of this course is to further knowledge of applications and theories in the area of games of normal form and extensive form. This is a *serious* course in which you will learn how to do game theory, including its technical sides. We are going to derive most of the results from primitives and will not take any formulae as given. After learning some equilibrium concepts, we will solve many games from economics, business, sports, politics, gambling, and etc.

I hope that by the end of this course, your point of view (not only the one towards economics but also towards many fields of social sciences) will be refined.

BACKGROUND

You are expected to be familiar and fluent with introductory calculus, ECON201 and ECON 204. In the course, we are going to read and write some proofs of selected theorems. I may review some aspects of writing proofs if I see fit.

It is important to point out that you are **not** required to have taken a Mathematical Analysis course (*MATH 301*). Even though the level of analytical abilities is not low, the mathematics that I will be using involves only elementary operations (used in concise and elaborate analytical steps).

TEXTS

I will not follow a particular book word for word, yet, the below listed books do cover the same material with lots of examples.

- *Game Theory for Applied Economists*, Robert Gibbons, *recommended*, the author is a famous game theorist, and the book is very well organized. That is a very good book that you want to keep for your own library. I will put important parts of it to the reserve at the library if needed.
- *Game Theory and Economic Modeling*, David Kreps, Oxford University Press, 1991; *recommended*, it is a very famous book by a well-known game theorist offering a solid introduction to the subject. That is a very good book that you want to keep for your own library. I will put important parts of it to the reserve at the library if needed.
- *A course in Game Theory*, Martin Osborne and Ariel Rubinstein, MIT Press, 1994; *recommended*, this too is a very famous book by two well-known game theorists. It is an introductory game theory textbook for graduate-level game theory. That is a very good book that you want to keep for your own library. I will put important parts of it to the reserve at the library if needed.
- Our **main sources** are the following: Our lecture notes, the scanned lecture notes that I will be sending accompanying our online lectures, and homework answer keys. All of those will be sent in time via announcements at our website SuCourse+.

COURSE CONDUCT

Due to the decision of Sabancı University, our course will be conducted online. Using modifications based on students' suggestions from previous online courses, the details of the *hybrid* system I intend to employ emerge as follows:

- Our “***static lectures***” will be done *asynchronously* by providing you a video file (over YouTube) that I will record. These lectures will be providing you roughly two-three hours of course material every week. As I am not bound with physical limitations, I may cover the course material in a video slightly longer than the two-three hour mark to provide you more helpful insights and examples. The lectures will be announced through the SuCourse, and these announcements will contain the pdf of that particular lecture along with the link to the online video file.
- Besides the static lectures, I will arrange, “***synchronous lectures***” 60-minute weekly online synchronous “meetings” over Zoom on Tuesdays during our lecture time starting 4:40 pm primarily to interact with you synchronously and to take and answer your questions. You are supposed to join these meetings. Thus, please do not send me time conflict permits unless you cannot graduate without taking this course at the end of this semester! You need to prove that if you claim so.

During these meetings, I intend to solve questions and give you more examples (instead of additional course materials) after answering your questions. These meetings will be recorded and posted on YouTube to be available to those who miss them. Moreover, the notes that we prepare during these meetings (on iPad with its pen) will be sent to you as well.

- There will be weekly ***recitations*** conducted by the ECON TA assigned to this course. Your TA will arrange a recorded Zoom meeting every week on Tuesday – 1:40 pm - 2:30 pm. Thus, please do not send me time conflict permits regarding this time slot. Moreover, these recorded Zoom meetings will be available online for those of you who missed them. I need to stress that your participation to the recitations are strictly expected!
- My advice for you is to follow this course on a timely basis and work every week as the course progresses. If you wait, do not follow the course and accumulate materials, do not come to our meetings to ask questions, and study just before the examinations, then it is highly probable that you will not show a strong performance. Online methods, I think, are very efficient for those students who want to learn. Therefore, please regard this as a fair warning urging you to come to our meetings, work in a timely manner, and follow the course.
- The examinations of this course will be conducted online adhering to the regulations called for by our university. On top of those, each student participating in any examination of this course is obliged to read and sign the printed version of some version of the following statement at the beginning of the examination and keep it safe in order to be able to give it to me in the first opportunity that arises. If the student does not have a printer, then the student must write this statement completely on some piece of paper (include the date) and scan the handwritten version and send it along with his/her examination (while keeping it safe to submit it to me in the first opportunity that presents itself). This statement can be changed to accommodate emerging regulations and/or altered slightly by the instructor if the need arises.

The following statement is from ECON370 - Fall 2020 Final examination and may be subject to change in our examinations if the need arises.

Statement of Academic Honesty and Integrity

I, hereby, declare that during the final examination of ECON 370 – Advanced Microeconomics – Fall 2020, I have not received, I have not given, nor will I give or receive, any assistance from/to another party and/or a student taking this examination, including discussing and/or corresponding (over conventional and online media) about the examination with fellow students and other parties. Moreover, I will not use any electronic devices apart from calculation purposes and going over the lecture notes to assist me on this open-book examination. I will not cheat and plagiarize someone else’s work and turn it in as my own. I understand that acts of academic dishonesty may be penalized to the full extent allowed by the Sabancı University, including receiving a failing grade for the course and facing further disciplinary actions.

Name of the Student:

Signature:

Date:

GRADING

- **Take-Home Examinations:** (%30 of grade) There will be 5 take-home examinations, each with a due date of 1 (or 2) week(s).

Important Issues concerning take-home examinations:

- Students are encouraged to work together. Thus, come together and do the questions in a group. BUT, no outsiders under any circumstances! This cooperative work permit extends only to your fellow students, and if I catch you getting your homework done by an outside party (with or without compensation), I will pursue this with all the disciplinary regulations available.

Notice that these are not homework assignments but take-home examinations. Thus, according to YÖK regulations, they are subject to disciplinary regulations.

- Each student has to submit his/her work separately. I will not accept “group answers”. Those who submit such work will get 0 from that particular work.
- The front page of the work **MUST** contain all the names of the students that you worked with. These names have to be listed in a “list of collaborators”.
- As the answer keys will be posted online at the due date, **no late take-home examinations will be accepted**. This is a strict rule, so please adjust yourselves accordingly.

- **Midterm:** (%30 of grade) There will be **one midterm**.

The first midterm covers subjects of Nash equilibrium and normal form games and will be done prior to starting the extensive form games.

The particular timing of the midterm will be determined together with the students in the class.

Details of the procedure to be applied in connection with the midterm will be announced via SuCourse prior to the exam.

- **Final:** (%40 of grade) The final will be comprehensive –covering all the subjects– and will be administered on the date announced by the ÖK.

Details of the procedure to be applied in connection with the final will be announced via SuCourse prior to the exam.

COURSE CONTENT

Students will be responsible only for the material they see in the lectures. So, they will be not responsible for subjects that are not covered in the lectures. And now the list of topics to be covered:

0. Preferences over Lotteries

- Modeling risk via lotteries, preferences over risky prospects, and rationality of individuals facing risky prospects,
- The expected utility theorem and its significant applications.

I. Games of normal form under perfect information

- Definition, and modeling strategic situations of one-shot nature,
- The expected utility theorem, and mixed strategies,
- Rationality considerations: Strict domination, Iterated elimination of strictly dominated strategies, weak domination, and rationalizability,
- Nash equilibrium, and its existence,
- Examples and applications in industrial organization:
 - Cournot, and Bertrand equilibria,
 - Bargaining,
 - Wars of attrition, games of timing,
 - Other examples,
- Non-stability of Nash equilibrium, refinements, (trembling hand) perfect equilibrium,

II. Games of extensive form

- Definition, modeling of strategic interactions involving a sequence of moves
- Behavioral strategies,
- Subgame perfect equilibrium,
- Repeated Games,
- Examples and applications in industrial organization.
 - Von Stackelberg competition,
 - Repeated Cournot oligopoly,
 - Repeated Bargaining.

After finishing the above subjects, time permitting, we will continue selecting subjects from the following list:

III. Normal form games with imperfect information

- Definition, and modeling one-shot strategic interaction under imperfect information,
- Bayesian Nash equilibrium,
- Moral hazard, adverse selection,
- Auctions.

IV. Extensive form games with imperfect information

- Definition, and modeling sequential strategic interaction under imperfect information,
- Perfect Bayesian and Sequential equilibria,
- Examples, and applications in industrial organization
 - Signalling games,
 - Entry deterrence games.

V. Cooperative Games

- Definitions, and modeling strategic interaction of cooperative nature,
- Transferable utility versus non-transferable utility cooperative games,
- games in coalitional form, convex games, balanced games,
- Core,
- Shapley Value,
- Bargaining, coalition formation, and cooperation,
- Noncooperative justification for coalition formation, Correlated Equilibrium.

POLICIES: EXAMINATIONS, TAKE-HOME EXAMINATIONS, AND SCHOLARLY CONDUCT

1. Take-home examinations should be turned in by the announced deadline. Our policy is strict and decrees that *no late take-home examinations will be accepted.*
2. All answers to take-home examinations, midterm, and the final must be neatly and clearly written. The grader is the final judge of what is legible and may request specific students to type their work.
3. Collective and cooperative work on take-home examinations is strongly encouraged. However, any take-home examination *must* be written up separately by the owner of it. Additionally, any take-home examination *must* contain the list of the fellow students with whom the work was done under the heading “List of Collaborators”. Notice that students are encouraged to work together. However, this does not extend to outsiders under any circumstances! The cooperative work permit is for your fellow students only. If I catch instances of a student getting his/her homework done by an outside third party (with or without compensation), I will pursue this with all the disciplinary regulations available. To that regard, notice that these are not homework assignments but take-home examinations. Thus, according to YÖK regulations, they are subject to disciplinary practices.

4. During the midterm and final examinations (and their make-up examinations if granted), the webcam of the student must always be on. If not, the examination at hand will be void. Moreover, the student must connect to the Zoom meeting of the examination with his/her official Sabancı University e-mail account and is not allowed to utilize other e-mail accounts unless explicitly permitted by the instructor.
5. Make-up exams are granted only in case of a valid and documented reason. Absence in exams without any valid and documented excuse will result in a grade of 0 from that exam. In case of an illness or other documentable excuses, the student is required to contact me within three business days with a petition summarizing his/her situation and preferably presenting documentation for their excuses.¹ I will also accept a formally written e-mail from the sabanciuniv.edu e-mail address of the student, and hence the petition does not have to be physical. The documentation could be in the form of a formal doctor's note from a state hospital² or police/insurance report in case of a minor traffic accident providing details; and so and so forth. All verified documentation has to be submitted physically in three business days following the expiration of the excuse or the verification date. If the instructor finds the excuse of the student valid, then either a make-up examination will be arranged, or the corresponding points from that examination will be shifted to the consequent examination. I wish to emphasize that due to YÖK regulations, I have to be quite strict about these formalities.
6. A student who fails to show up for the final examination without a valid excuse and does not take the make-up examination of the associated examination will receive N/A (and not F) as his/her final grade.
7. The definition for scholastic dishonesty is as given in the rules and regulations/announcements of the Sabancı University and include aspects concerning online evaluation/examination practices.
8. In case of scholastic dishonesty, no credits will be given for that particular work. Cheating during written work will result in an F for the course. All incidents of scholastic dishonesty will be reported to FASS.

¹These regulations are from the "Sabancı Üniversitesi Lisans Eğitim ve Öğretim Yönetmeliği" – *Resmi Gazete No: 29607 Tarih: 28 Ocak 2016 Madde 22-2-a.*

²A doctor's note taken from a doctor's private practice does not count as formal. In the case of private hospitals, the doctor's note has to be verified by the university health service within five business days following the expiration date of the doctor's note.