SFU ECONOMICS Spring 2025

ECON 222: Introduction to Game Theory

Lectures: M 14:30-16:20 in RCB 8100
Instructor: Shih En Lu (shihenl@sfu.ca)
Office Hours: W 13:30-14:20 in WMC 4661 – no appointment required
Fridays on Zoom (https://sfu.zoom.us/j/4142842639) **by appointment only (must email me ALL times that work for you by 5pm Thursday)**
Website: www.sfu.ca/~shihenl/222/

TA: Huiqian Song (huiqians@sfu.ca)	Tutorial:	D101	D102	
Office Hours: M 9:30-10:30	Time:	Th 8:30	Th 10:30	
Office: WMC 3607	Room:	AQ 5025	AQ 5025	

Note: Office hours start on 1/14, and tutorials start on 1/16. Come to office hours early enough to be done by the end time, keeping in mind that there may be a queue.

The following documents, posted online, are an integral part of this syllabus: "Policy on Missed Requirements" and "Regrade Policy". You should consult them, as needed, for more details about the parts of this document labeled with a star (*). The "Details about Grading" document contain more precise grading information.

I. GENERAL INFORMATION

Course Description

This course introduces students to game theory and its applications in various fields, with an emphasis on economics. Topics include iterated strict dominance, Nash equilibrium and subgame-perfect equilibrium, which are also covered in ECON 302, but with different applications. Additional material includes evolutionarily stable strategies and, if time permits, Bayesian Nash equilibrium.
Prerequisite: ECON 103, ECON 113 with a minimum grade of A-, or MATH 157

Textbooks

The required textbook for this course is:
- Gibbons, *Game Theory for Applied Economists*, Princeton University Press.
However, if you have another introductory game theory textbook, you may refer to that one instead. Just be aware that it may be farther from the course in terms of the order in which material is presented, and some terms may be defined differently. Examples of acceptable alternatives (some of which are on reserve at the library) include:
- Watson, *Strategy: An Introduction to Game Theory*, W.W. Norton & Company.
- Osborne, *An Introduction to Game Theory*, Oxford University Press.
- Tadelis, *Game Theory: An Introduction*, Princeton University Press.
Note: While Osborne is a good book in general, be warned that its usage of the expression "perfect information" is nonstandard and will be considered incorrect in this course.

Furthermore, some applications are taken from the following non-technical book, which is highly recommended (but not required) reading. **The final exam will include bonus questions about this book worth 5-8 points (around 10% of the final).**
- McAdams, *Game-Changer*, W. W. Norton & Co.

Technical Requirements

You must have devices and an internet connection that enable you to:

- **Participate in MobLab activities while in class**
- Scan/capture images of handwritten work (*e.g.*, problem sets) and upload them to Canvas
- Use Zoom, with video and audio, for remote instruction (if needed) and office hours

Moreover, if the midterm and/or final exam(s) need(s) to be conducted remotely, you will need **two internet-enabled devices:** one for taking the exam (*e.g.* computer) and one through which you will be proctored (must be Zoom-capable with video and audio).

COVID-19 Safety

Depending on the epidemiological situation, Prof. Lu may institute a masking requirement in the classroom even if there is no such provincial or university requirement.

Rapid tests can be picked up for free at most pharmacies, so **you should have rapid tests at your disposal at home as you may need a positive test to justify an absence.***

Lectures

Questions during lecture are encouraged. Lecture slides are just a sketch of the material, so **you should take your own notes to complement them**. If you miss a class, you are welcome to see me or your TA after getting a classmate's notes and reading them carefully. We are always happy to answer your questions about the material, but it is not our job to repeat the lecture!

Tutorials

If you find that there isn't enough problem-solving during lectures, attend tutorials.

- In weeks immediately preceding problem set due dates, you will ask questions about the upcoming problem set and the parts of lectures that you find unclear. **You are expected to at least take a look at all problem set questions before tutorial.** (If there are no or few questions, your TA will review some key concepts from class.) Then, you will start/continue working on the problem set in small groups and ask questions to your TA as they come up. Your TA will take note of any questions that may be helpful to others and go over them at the end of tutorial.
- In the weeks of problem set due dates and the midterm, your TA will go over the solutions.
- In other weeks (if any), you will review/discuss key concepts from class, and your TA will cover additional examples.

Office Hours and Communication

At office hours, you are encouraged ask any question you have about the course material (be specific), microeconomic theory, or studying economics. For advice about textbooks and studying, see the Canvas FAQ.

Read all emails sent to you by the course staff: they may contain important announcements. You may email the course staff. Although we will usually respond promptly, we cannot guarantee it.

II. REQUIREMENTS AND GRADING

If you need to miss a course requirement, please immediately consult the course policy on missed requirements*, BEFORE contacting the instructor. That document lays out the rules in detail (documents to submit, deadlines, and what happens if your request is accepted).

- **No academic concession is available for MobLab participation or problem sets before the 3rd graded lecture or the 2nd problem set missed for valid reasons**.

- Students that miss the final, even for a valid reason, may not receive an academic concession if they also missed the midterm or are failing this course before the final.
- Religious accommodation requests for the final must be made before the midterm.

Your grade in this course is based on the following four assessments:

o MobLab Participation[1] (11)		3 pts each, lowest 2 dropped	18%
o Problem Sets (5)	Due Mondays, 2pm	6 pts each, lowest dropped	16%
o Midterm	March 3, during class	39 pts + "challenge"	26%
o Final	To be announced	60 pts + "challenge" + bonus	40%

Your **numerical course grade (G)**, out of 150, is the sum of all points (including challenge and bonus points) that are not dropped, minus a potential penalty detailed in the "Regrade Policy" document. (Don't worry: most semesters, no one is penalized.) The dropping of a problem set and two lecture scores allows you to miss some work without impacting G for reasons like illness, with no need for academic concessions. Missing class voluntarily may be risky, especially early in the semester: you may need that leeway later.

Your **letter grade** is determined by comparing your G with grade thresholds, without any rounding. See "Details about Grading" for how grade thresholds are determined.

MobLab Participation

Participation in games and questions through MobLab is worth 3 points per lecture, starting with the second lecture. Within each lecture, the points are distributed evenly across activities. Thus, if there are two games and two quizzes, then each is worth 0.75 points. Simply participating gives you full credit unless your performance shows that your participation is not always serious. **If, during a lecture, your play in a game suggests that you do not understand it, or you answer very easy questions wrong, you will be warned after class and get 0/3. The second warning of the semester comes with up to 9 additional marks lost (see "Details about Grading"). The third warning leads to a participation score of 0/27 for the semester.**

Problem Sets[2]

Problem sets count as one assessment in 5 parts, each graded out of 6 for completeness only. Show your steps on all questions. You are encouraged to help each other, but each of you must **handwrite** your OWN solutions. Submit them via Canvas (see Canvas for file requirements).

No submission will be accepted after Canvas submissions are closed. If you have technical difficulties with Canvas, email your work to your TA before the deadline.

Do not copy anyone's work, including a tutor's[3], and do not let anyone copy your work: solutions suspiciously similar to a past semester's solution set or a classmate's are evidence of academic dishonesty and may lead to serious consequences such as a score of zero for ALL parts of this semester's problem set assessment. An academic dishonesty report will be filed, which may lead to further consequences.

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[1] If you or a household member are at high risk from COVID-19, see the policy on missed requirements.*

[2] Most problems are the same as in past semesters, so solutions may be accessible. Consulting them before doing the problems is a bad idea: (i) An important purpose of problem sets is to make you actively think through the problems. Learning externally provided answers short-circuits the learning process. (ii) Risk of academic dishonesty. (iii) Problem sets are evaluated for completeness only, so there is no grade advantage to seeing the answers in advance.

[3] Thus, if you use a tutoring service, you should demand that it cover problem set solutions AFTER the due date.

Exams (Midterm and Final)

Tests are closed-book and cover all material from lectures and problem sets. The final is cumulative, but will emphasize new material. See the "Details about Grading" document for information about question types.

Inaccurate Records

You are responsible for ensuring that your scores shown on Canvas are complete and accurate. Report any inaccuracy by emailing your TA. No MobLab score will be corrected more than one week after being posted, and no problem set or midterm score will be corrected after the final exam even if you can show that a score is missing or inaccurate.

III. TENTATIVE COURSE SCHEDULE

Problem sets are due in weeks marked with a star (*). This schedule may be updated.
The relevant sections of Gibbons are provided where available. Note that Gibbons often uses "strategy" to designate "pure strategy"; in this course, "strategy" means "mixed strategy."

Parts I-III: No Uncertainty – Pure Strategies in Games of Complete Information

Part I. Simultaneous-Move Games

Week 1	1/6	Introduction to course, Preferences and utility
Week 2	1/13	Basic definitions (1.1A and "mixed strategy" on pp. 30-31)
		Iterated dominance (1.1B)
Week 3*	1/20	Pure-strategy Nash equilibrium (1.1C, including Appendix)
Week 4	1/27	Examples, Evolutionarily stable strategies

Part II. Games of Perfect Information

Week 5*	2/3	Sequential games: introduction/definitions (2.4 up to page 118),
Week 6	2/10	Backward induction (2.1A, pages 126-128)
	2/17	**Reading Week (no class)**
Week 7*	2/24	Catch up, if required
Week 7 and/or Week 9		Applications of backward induction (2.1D)
Week 8	**3/3**	**Midterm** (covers Weeks 1-7)

Part III. Multi-Stage Games with Observed Actions

Week 9	3/10	Introduction (2.2A 1st page, rest of 2.4A)
Weeks 9-10	3/10-17	Subgame perfection (rest of 2.2A, 2.2B, 2.4B)
		Note: In this course, the whole game counts as a "subgame."
Weeks 10-11*	3/17-24	Repeated games (2.3 up to page 96)

Part IV: Mixed Strategies

Weeks 12-13*	3/31-4/7	Mixed strategies (1.3)
		Expected utility theory if time permits
		Note: The last day of tutorials is 4/3.
		Practice problems on topics from last week will be provided.
	TBD	**Final Exam** (covers all course material)