66-115: Freshman Seminar
Introduction to Thinking Strategically

Professor John Gasper

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Course Time / Location:
MWF 9:30-10:50am;
Room: PH A19A

Instructor: John Gasper
Office: POS 354
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Office Hours: Tues/Wed/Thur 3-5pm & **by appointment**

In general, I have an open door policy: if my door is open and I'm not meeting with someone, you are welcome to come in and meet with me. If my door is closed, I am not available (out of the office, working, etc). I know finding office hour times that work for everyone is difficult. Consider these a suggested meeting time, but I highly encourage you to schedule an appointment. Please, don't interpret a closed door as me not wanting to meet with you. I do, but just send me an email to schedule some time.

Required Materials:

- *Games of Strategy* by Dixit, Skeath, and Reiley.
- Various handouts distributed during class

Course Description and Goals

In business, and in life, we rarely make decisions in a vacuum. The optimal course of action often depends on what others will do. Game theory is the formal study of strategic interaction and aims to help us understand situations where rational decision makers interact. This course will focus on the theory of non-cooperative games with an emphasis on economic and business applications.

Game theory has origins in applied mathematics and we will often take an analytical / formal approach. However, the emphasis will not be on the technical aspects of the theory. The course is intended to be an introduction to the applied use of game theory. In particular, we will use equilibrium analysis to study topics including competition, credible threats, commitment problems, and the strategic use of information via signaling and screening.

Using models we can build intuitions about strategic behavior which will hopefully carry over to many different situations. All models are abstractions and don't capture every aspect of the situation. Hence, the goal of this course is not for you to be able to use game theory to "solve" strategic interactions that you'll face. Rather the ultimate goal is to develop your ability to think strategically in complex interactive situations.

At the end of this document you will find a *tentative* schedule for the semester, that will almost surely change as we progress. That said, the underlying objectives of the course will remain:

- Lean about the field of Game Theory and the mathematical study of strategic interaction.
- Analytically solve for various types of equilibria.
- Analyze real life situations as "games."
- Develop your ability to think about others incentives in interactive situations.

Attendance and participation

It is easy to take the attitude that your job (and mine) is accomplished with your mastery of the material of the course, and consequently that I need not bother with whether you show up for class. Realistically, we know that in general the vast majority of students who feel they don't need to come to class are mistaken, but only find that out, to their shock, as they do poorly in the course. The pace of the course will be fairly fast. If you miss a class, you will be substantially behind. I will expect you in class and I expect you on time. This not an "easy" course and a large part of the material will not come from the text. The exam will cover both sets of material.

More importantly, your class participation also provides important feedback to me regarding how well topics are getting across. If something that isn't clear to you, please let me know. You are probably not the only one. Attendance is necessary but not sufficient for effective participation, which also requires actively engaging the material. That said, if you feel uncomfortable about class participation either in general or for specific topics, see come talk to me and we'll find some way around it.

I will also make an effort to get to know you. It is also fair to say that those who sit near the front and participate in class will get the benefit of the doubt when their grades are below a borderline. During the first week of class, I ask that you schedule an appointment with me and come by my office. These meetings will probably only last about 10 minutes but I find them incredibly valuable. I feel that I can best present material to you only after I know about you.

Cell phones and laptops

I understand that many of you will use a laptop to take notes during the lecture. This is fine. I am also willing to venture a guess that many of you will be tempted to check your email, the news, etc. This is not fine. It's distracting to me and more importantly your fellow students.

I also ask that you turn off your cell phone during class. If there is an emergency and you might need to be contacted, please talk to me before class. Otherwise there should be no reason to hear a phone ring or see someone send a text. Text messages and phone calls during class are very distracting and disrespectful to me and your other students. If you are surfing the internet, texting, etc, during class you will be asked to leave.

Course Logistics

This course has a Canvas site. The sites should set up and functioning. Our class page can be accessed via the following URL:

https://canvas.cmu.edu/courses/4293

Handouts, problem sets, updated syllabi and announcements will be posted to Canvas and you are responsible for checking the site regularly. I welcome questions during class: if you have a question or a comment, please let us know. I will generally pause after each slide and ask if there are any questions. *Please feel encouraged to raise questions during class.* I am also fairly accessible via email, but you should not expect a reply immediately (within 24 hours).

Accommodations for Students with Disabilities

Carnegie Mellon University is committed to providing reasonable accommodations for all persons with disabilities. I would ask any student needing a learning accommodation to let me know at the beginning of the term so that we can work out necessary alternative assessment options. All information will be considered confidential and only released to appropriate persons on a need to know basis.

Health & Well-being

Take Care of Yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, I strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call412.268.2922 to make an appointment. Consider reaching out to a friend, faculty or family member you trust for help.

Academic Integrity

You should feel encouraged to talk with your class mates about the problems on the problem sets, but do not copy even parts of someone else's work.

The CMU policy on cheating and plagiarism has been updated. Notice the following text: *In all academic work to be graded, the citation of all sources is required. When collaboration or assistance is permitted by the course instructor(s) or when a students the services provided by Academic Development, the Global Communication Center, and the Academic Resource Center (CMU-Q), the acknowledgement of any collaboration or assistance is likewise required. This citation and acknowledgement must be incorporated into the work submitted and not separately or at a later point in time. Failure to do so is dishonest and is subject to disciplinary action.*

I am very sensitive to cheating and plagiarism; the policy in this course is that cheating of any kind will not be tolerated. **If one of us suspects an academic integrity violation, we will report it to the CMU administration and you will be penalized one letter grade off of your final grade.** If you have any doubt about your actions, please ask me. I strongly encourage you to review Carnegie Mellon's policies regarding academic integrity. A good online source for the academic integrity policy is:

http://www.cmu.edu/academic-integrity/index.html

Grades

Each student's grade for the course will be based on the following:

1. *Participation* 10%
2. *Homework Exercises* 10%
3. *Exam* 25%
4. *Final paper and presentation* 25%
5. *Quizzes* total 30%

The only way to learn the material is to do it. There will be (roughly) weekly problem sets distributed that will be graded on a "check-minus / check-plus" system where credit will be given for completing the problem set. A check will mean that you've reasonably attempted the problems; a check-plus is awarded for exemplary work and a check-minus for a poor and deficient attempt. Solution sets will be posted and you will be responsible for checking that your work is correct.

Participation will also be a significant component of your grade. Just showing up to class, however, will not be sufficient for the full score. Throughout the course you'll be playing several games against and with your classmates. Your performance in these settings will in part determine your grade.

Mastery of the material will be gauged via in-class quizzes and an exam. There will be four quizzes, each lasting about twenty minutes, and one scheduled exam during the semester. The logistics for the exams are still being determined. Finally there will be a final paper and presentation for this course.

I know that your schedule during the semester can be hectic. I also know that various events can happen during the semester that make finishing projects on time difficult. I also, however, expect you to know these things as well. I have a no make-up policy, unless it is a university approved absence.

Weekly readings and course outline

Class	Day	Date	Topic	Reading	Assignment
1	W	17-Jan	Intro and Notation	GS1 and 2	
2	F	19-Jan	Sequential Games	GS3	
3	M	22-Jan	Sequential Games	GS4	
4	W	24-Jan	Normal Form Games	GS4	
5	F	26-Jan	Normal Form Games	GS5	
6	M	29-Jan	Normal Form Games	GS5	PS1 due
7	W	31-Jan	Continuous Strategies	handout	Quiz 1
8	F	2-Feb	Continuous Strategies	handout	
9	M	5-Feb	Stage Games	GS5	
10	W	7-Feb	Stage Games	GS6	
11	F	9-Feb	Subgame Perfection	GS6	PS 2 due
12	M	12-Feb	Subgame Perfection	GS7	
13	W	14-Feb	Mixed strategies	GS7	
14	F	16-Feb	Mixed strategies	GS7	
15	M	19-Feb	Mixed strategies	GS8	PS3 due
16	W	21-Feb	Comparative Statics	GS7	
17	F	23-Feb	Examples	handout	Quiz 2
18	M	26-Feb	Examples		
19	W	28-Feb	Examples		
20	F	2-Mar	Implications		PS4 due
21	M	5-Mar	Implications		
22	W	7-Mar	**Exam 1**		EXAM
23	F	9-Mar	BREAK		
	M	12-Mar	BREAK		
	W	14-Mar	BREAK		
	F	16-Mar	BREAK		
24	M	19-Mar	Repeated Games	GS12	
25	W	21-Mar	Repeated Games	GS12	
26	F	23-Mar	Repeated Games	GS13	
27	M	26-Mar	Bayesian Games		Quiz 3
28	W	28-Mar	Bayesian Games		
29	F	30-Mar	Bayesian Games		
30	M	2-Apr	Bayesian Games		
31	W	4-Apr	Asymmetric Info: Signalling		
32	F	6-Apr	Asymmetric Info: Signalling		Quiz 4
33	M	9-Apr	Asymmetric Info: Screening		
34	W	11-Apr	Asymmetric Info: Screening		
35	F	13-Apr	Mechanism and Contract Design		
36	M	16-Apr	Mechanism and Contract Design		
37	W	18-Apr	Mechanism and Contract Design		
	F	20-Apr	BREAK		
38	M	23-Apr	Additional Topics		
39	W	25-Apr	Additional Topics		Quiz 5
40	F	27-Apr	Additional Topics		
41	M	30-Apr	TBA		
42	W	2-May	TBA		
43	F	4-May	Presentations		
		TBA	Presentations		