

# 70-442: Principles of Game Theory for Business

Fall 2013  
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*Instructor:* John Gasper  
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*Course Time / Location:*  
Sunday, Tuesday, and Thursday 10:30-11:50am;  
Rooms 2052

*Office Hours:* TBA

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). On non-teaching days, I'm often quite busy with research and not available. I highly encourage you to **schedule an appointment** to make sure I will be available.

*Required Materials:*

- *Games of Strategy* by Dixit, Skeath, and Reiley.
- *Game Theory for Applied Economists* by Gibbons

## 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.

Finally, this course is a 6-unit mini, which means that it should be the same workload as a 12-unit full semester course. We have a lot of material to cover and only seven weeks. Therefore, we will be going at a rather fast pace. For example, we'll be covering almost a chapter per class meeting. Below you'll find a tentative outline of the course and the details of how grades will be assigned.

## 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 on exams. This course is a mini course with lots of material to cover. 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 lecture material will not come from the text. The exams will cover both sets of material.

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. On the second day of class I will pass around a sheet with available times. 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 Piazza site. The sites should set up and functioning. Our class page can be accessed via the following URL:

<https://piazza.com/qatar.cmu/fall2013/70442/home>

Handouts, problem sets, updated syllabi and announcements will be posted to Piazza and you are responsible for checking the site regularly. I will also maintain the Piazza discussion board. If you have any questions about the techniques, problem sets, etc, ask them on the discussion board. It has been my experience that one of the best ways to learn something is to try to explain it to someone else. So I will expect you to try to answer the questions that other students ask; doing so will aid the participation element of your grade.

I welcome questions during class: if you have a question or a comment, please let me know. I will generally pause after each slide and ask if there are any questions – please feel encouraged to raise questions during class. I’m also fairly accessible via email, but in general don’t expect a reply immediately.

## Grades

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

1. *Participation* 10%
2. *Homework Exercises* 20%
3. *Midterm Exam* 20%
4. *Comprehensive Final Exam* 20%
5. *Quizzes* 10% each (best 3 of 4: 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.

Mastery of the material will be gauged via in-class quizzes and exams. There will be five quizzes and 2 scheduled exams during the semester. The quiz material will be based off of material on the assigned problem sets. The logistics for the exams are still being determined.

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 extensions and no make-up policy, unless it is a university approved absence.

## 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 homework is graded on a check system to encourage you to attempt the homework yourself.

I am very sensitive to cheating and plagiarism; my policy is that cheating of any kind will not be tolerated. 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.studentaffairs.cmu.edu/theword/acad\\_standards/integrity.html](http://www.studentaffairs.cmu.edu/theword/acad_standards/integrity.html)

## Weekly readings and course outline

Date	Topic	Reading	Tests
25-Aug	Intro and Notation	GS1 and 2	
27-Aug	Sequential Games	GS3	
29-Aug	Normal Form Games	GS4	
1-Sep	Normal cont:	Gibbons p1-27	Quiz
3-Sep	Evidence	GS5	
5-Sep	Combining Sequential and Simultaneous	GS6 and Gibbons 55-68	
8-Sep	Mixed strategies	GS7	Quiz
10-Sep	Sequential Games III: mixing	GS8	
12-Sep	Dynamic games: general theory	GS8	
15-Sep	<b>Exam 1</b>		EXAM
17-Sep	Bayesian Games	GS9	
19-Sep	Asymmetric Info	GS9	
22-Sep	Asymmetric Info: Signalling	Gibbons 173-190	Quiz
24-Sep	Asymmetric Info: Screening	Gibbons 190-218	
26-Sep	Strategic Moves: Credible Commitments	GS10	
29-Sep	no class		Quiz
1-Oct	Collective Action Games	GS12	
3-Oct	Repeated Games	GS11	
6-Oct	Mechanism and Contract Design	GS14	
8-Oct	Cooperative GT	TBA	
10-Oct	<b>Final Exam</b>		EXAM