



ECO 355/AMS 335

Game Theory

Spring 2018: January 22 - May 5, 2018

Days and Time: Mondays and Wednesdays 5:30-6:50 pm.

Room: Melville Lbr. W4540

Instructor

Camilo Rubbini

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Course website: <https://blackboard.stonybrook.edu/>

Office Hours: Mondays and Wednesdays 11:30am to 1:00pm
and by appointment.

Office room: SBS building N645.

COURSE SYLLABUS

Course Description: We call *games* to situations of strategic interaction, or in other words, to circumstances in which decisions taken by an individual affect other individuals' well being. *Game theory* is a formal way of thinking about these situations (or games). Most of your interaction with others in your everyday life can be thought of as a game, and game theory will give you an additional perspective about it.

Game theoretic models have been widely applied to the study of behavior in a variety of disciplines including economics, business, psychology, political science, linguistics, and biology among others. This course has two objectives: the first one is to introduce you to the basic tools needed to formally analyze strategic interaction. You will learn a methodology that will help you understand simultaneous and sequential games with perfect and imperfect information. The second goal is to discuss economic applications of the theory. In particular, we will cover problems related to bidding behavior, market competition, bargaining, contracting, and voting. We will also pay attention to the growing literature on experimental games.

No mathematical knowledge beyond what is typically taught in high school is required. However, some willingness towards abstract thinking is essential for this class. At the beginning of the course I will provide you with an overview of the mathematical skills you will need throughout the course. It is great having you onboard!

Course Objectives: After you complete this class you will be able to

1. Identify situations of strategic interaction and construct a game theory representation of the situation.
2. Differentiate among alternative solution concepts, select the solution concept that applies to the problem at hand, and apply an appropriate technique or algorithm to find it.
3. Apply game theory to make predictions about individual behavior in auctions, bargaining, market competition, and political competition.

Recommended Textbooks:

Strategies and Games: Theory and Practice by Prajit K. Dutta, MIT press, 1999, 1st Edition, ISBN: 9780262041690.

Game Theory: A very short introduction by Ken Binmore, Oxford University press, 2008, 1st Edition, ISBN: 9780199218462.

Additional lectures will be suggested in class.

Grading Policy: Your grade in this class will be based on your performance in 6 quizzes and two exam. Quizzes will account for 20% of your grade and each exam will account for 40% of your grade.

Quizzes (20%): You will have 8 graded quizzes. Quizzes will be open notes problems for you to complete at the end of the class. For your final grade I will only consider the best 6 of your quizzes' scores (the lowest 2 scoring quizzes will not count towards your final grade). I will announce each quiz date in class. There will be **NO** makeup quizzes; to complete quizzes you must be in class.

Exams (80%): There will be three exams in this class: two midterm exams and a final. **ONLY** your best two exam grades will count towards your final grade (your lowest exam grade will be dropped). Midterm exams are **NOT** cumulative. The final exam **IS** cumulative and will include everything covered in class. After grading your second exam I will post provisional final grades so you can decide whether to take the final for the chance to improve your grade or to keep your provisional final grade. Since your lowest exam grade is dropped, there will be **NO** makeup exams.

Letter Grade Distribution:

≥ 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	60.00 - 66.99	D
80.00 - 82.99	B-	≤ 59.99	F
77.00 - 79.99	C+		

Important Dates: Please, add the following dates to your calendar

Important Dates

Wednesday, February 28 th	Exam 1 <i>in class</i> .
Wednesday, May 2 nd	Exam 2 <i>in class</i> .
Thursday, May 10 th	Final Exam 8:30pm - 11:00pm.

Tentative Course Outline:

Week	Content
Weeks 1-2	<p style="text-align: center;">The Language of Game Theory I: Building Blocks</p> <ul style="list-style-type: none"> • Players and Strategic Interaction. • Actions and Strategies. • Rationality and Common Knowledge. • Preferences and Payoffs. • Sequential and Simultaneous Moves. • Single and Repeated Interaction. • Strategic and Extensive Representation.
Weeks 3-4	<p style="text-align: center;">The Language of Game Theory II: Rational Behavior</p> <ul style="list-style-type: none"> • Dominant and Dominated Strategies. • Iterative Elimination of Dominated Strategies. • Best Responses. • Rationalization. • Nash Equilibrium.
Weeks 5-6	<p style="text-align: center;">Static Games of Complete Information</p> <ul style="list-style-type: none"> • Strategic Representation Revisited • Nash Equilibrium Revisited. • Pure and Mixed Strategy Equilibria. • Existence of Nash Equilibrium. • Applications.
Weeks 7-9	<p style="text-align: center;">Dynamic Games of Complete Information</p> <ul style="list-style-type: none"> • Extensive Form Revisited. • Perfect Information and Backward Induction. • Imperfect Information and Subgames. • Subgame Perfect Nash Equilibrium. • Applications.
Weeks 10-11	<p style="text-align: center;">Repeated Games</p> <ul style="list-style-type: none"> • Finitely Repeated Games. • Subgame Perfect Nash Equilibrium Revisited. • Infinitely Repeated Games. • Trigger Strategies and Folk Theorems. • Applications.
Weeks 12-14	<p style="text-align: center;">Games of Incomplete Information</p> <ul style="list-style-type: none"> • Static Games of Incomplete Information. • Bayesian Nash Equilibrium. • Dynamic Games of Incomplete Information • Information Sets, Knowledge, Beliefs, and Consistency of Beliefs. • Perfect Bayesian Nash Equilibrium. • Applications.

Academic Honesty Policy Summary: Dishonesty of any kind is not tolerated in this course. Dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with academic work of other students. Students who are found dishonest will receive the most severe academic sanction consistent with the University policies. For more on academic integrity, click on or type in the following URL address: http://www.stonybrook.edu/commcms/academic_integrity/

Valid Excuses: During the course many possible events may occur that would result in your inability to complete your assignments or perform at a minimally acceptable level during an examination. Illness or injury, family emergencies, certain University-approved curricular and extra-curricular activities, and religious holidays can be legitimate reasons to miss to be excused from a scheduled examination. If you have a valid excuse, please discuss it with your instructor as soon as possible.

Students With Disabilities: Any student who, because of a disability, may require special arrangements to meet course requirements should contact Disability Support Services (DSS) at 631-632-6748 or online at <http://studentaffairs.stonybrook.edu/dss/>. Employees at DSS will determine appropriate arrangements. All information and documentation is confidential.

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Disclaimer: Any change in the syllabus will be announced by email and in the *Announcements* section in the course website. You are expected to check your email and to log-in into the course website regularly.