CAS EC403(SA1)	Boston University
Game Theory	Summer I, 2016

INSTRUCTOR: **DR. HSUEH-LING HUYNH**
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LECTURES: MTW 6-8:30PM CAS B06A
(*There is a class meeting on F6/3 to substitute for the holiday on M5/30.)

TEXT: Avinash Dixit, Susan Skeath & David H. Reiley Jr.,
Games of Strategy (4th ed.), W.W. Norton 2015

OFFICE HOURS: MT 4:30-6PM RM.309 270 BAY STATE RD.

GRADE: Tests 30% (Test1 [15%] + Test2 [15%])
Exams 70% (Exam1 [30%] + Exam2 [40%])
*** No make-up tests or exams will be given. ***

COURSE DESCRIPTION:

      The origins of modern game theory and its application to economics can be traced back to the 1830's, when the mathematician Antoine Augustin Cournot wrote his now famous model of duopoly, but for a century its development was fitful and slow. After the appearance of John von Neumann and Oskar Morgenstern's 'Theory of Games and Economic Behavior' in 1944, interest and research in the subject underwent a phase of rapid and extensive growth. It is now regarded by economists and social scientists as a central theory of human strategic interaction, and in recent years it has even entered the conversations of an educated public.

      In this introductory course, we will study the logical and analytic underpinnings of game theory. From the rigorous formulation of models of interaction and the concept of strategies, we will move on to the positive and normative assertions of game theory – Nash Equilibrium, Iterated Deletion of Dominated Strategies, Rationalizability, Sub-game Perfection, Evolutionary Stability, etc., and examine assumptions about human decision and social institutions that may support these assertions. Many of these ideas have been motivated by economic phenomena, which still provide the best illustrations of game theory as well as inspirations for game theorists.

      It is also well known that game theory frequently makes predictions which appear to be at odds with observed human behavior, whether seen in natural settings or deliberate experiments. We will discuss some of these findings, and may occasionally engage in experimentation ourselves. However, even when we feel that game theory fails to deliver empirically sound predictions or prescriptions, a useful way to understand why it may be so is to scrutinize its assumptions and logic as closely and deeply as we can.

      Being an advanced undergraduate course intended for economists, the student is assumed to come equipped with basic knowledge of economic theory and mathematics (including some calculus and probability theory), but most important of all is his/her ability and willingness to think clearly and logically.

COURSE SCHEDULE: See attached.

ACADEMIC CONDUCT: It is the student's responsibility to read, understand and observe the *Academic Conduct Code* (http://www.bu.edu/academics/resources/academic-conduct-code/, also available from CAS Advising and Student Academic Life or the BU Summer Term Office)., Cases of suspected misconduct will be referred to the Dean's Office. Furthermore, acts of plagiarism or cheating will be penalized with failing grades.

COURSE SCHEDULE   Details of this schedule are subject to change. Registered students can log into the course website at http://learn.bu.edu/. You should visit this website frequently to get the latest course schedule, check announcements, obtain class material and verify your personal grading record.

♦ LECTURE complements READING and self-study. They are not substitutes. To do well in this course, you must understand both thoroughly.

♦ HOMEWORK problems are specified as follows: "S2.1" refers to Solved Exercise S1 at the end of Chapter 2 of Dixit-Skeath-Reiley, while U2.3 refers to the Unsolved Exercise U3 in the same chapter. "S3.1- 3.4" means "S3.1, S3.2, S3.3 and S3.4". Additional problems may be given out in class from time to time.

♦ SOLUTION to the homework problems, tests and exams will be posted on the course website. But you will not benefit from the solutions unless you have worked seriously on the problems.

♦ A TEST will focus on homework problems assigned since the last test or exam. It is given in the last 45 minutes of class.

♦ An EXAM will test your comprehensive understanding of the course material up to the time of the exam.

 (!!) **ATTENDANCE:** This course is very intensive and each class is almost equivalent to one week's instruction during a regular semester. *Regular attendance is therefore essential*. Also, there will be *no make-up for missed tests or exams.*

DATE	LECTURE	READING	HOMEWORK
	Game Theory and Strategic Interactions		
M5/23	Model of Strategic Interactions:	Ch. 1, 2	S2.1-2.2, U2.3-2.4
	(1) Game Form and Payoffs		
	(2) Predicting Play and Giving Strategic Advice		
	Extensive-form/ Sequential-move Games & Backward Induction		
T5/24	Backward Induction and the problems it raises	Ch. 3	S3.1-3.4
	Model of the Decision Maker:		
	(1) Individual preference and optimizing behavior		U3.5-3.10
	(2) Knowing the preferences and rationality of others		
	What is a Strategy? Actions by self and Beliefs about others		
	Strategic-form (Normal-form)/Simultaneous-move Games & Nash Equilibrium		
W5/25	Normal-form Games with Complete Information	Ch. 4	S4.1-4.7, U4.1-4.7
	Nash Equilibrium and the problems it raises		S4.8-4.12
M5/30	*<Holiday: No Class>*		
T5/31	Dominant and Dominated Strategies		U4.8-4.12
	Iterated Deletion of Dominated Strategies		
W6/1	Relationship between Games in Extensive and Strategic Forms		
F6/3	*<Substitute Monday Schedule>*		
	Maximin and Rationalizable Strategies	Ch. 5	S5.4-5.6, U5.5-5.7

DATE	LECTURE	READING	HOMEWORK
	Game Theory and Economic Behavior		
M6/6 TEST 1	Continuous strategies and best-response functions	Ch. 5	S5.1-5.3, S5.7-5.9, U5.8-5.10
	Test covers homework problems from 5/23 through 5/31 (Chapters 1-4)		
T6/7	Cournot's Model of Oligopoly	Review relevant parts of your	
	Bertrand and Hotelling's Models of Oligopoly	Intermediate Microeconomics textbook	
W6/8	Economic Externalities and Collective Actions	Ch. 11	S11.1, S11.4, U11.3, U11.5
	Public Decisions and Voting	Ch. 15	S15.1-S15.2, U15.3, U15.5
	Auctions	Ch. 16	S16.2-16.4, U16.2-16.4
	Rubinstein's Bargaining Model	Ch. 17	S17.2, U17.1-17.2
M6/13 EXAM 1	*Exam covers course material through 6/8*		
	Extensive-form Games with Imperfect Information		
T6/14	Multi-stage Games, Inferences about the Past	Ch. 6	S6.1-6.5, U6.1-6.5
	Subgame Perfect Equilibrium and Sequential Rationality		S6.6-6.10, U6.6-6.10, U6.11-6.12
	Mixed Strategy		
W6/15	Mixed Strategies: Tax Evasion and Random Audits	Ch. 7	S7.1-7.10
	Interpretations of Mixed Strategies		U7.1-7.12
	Correlated Equilibrium		
	Strategic-form Games with Incomplete Information		
M6/20	Decision under Uncertainty:	Ch. 8, 9	S8.4-8.8, U8.9-8.10
	(1) Expected Payoffs		
	(2) Prior Beliefs and Factual Information		
T6/21	Promises and Threats: Are they credible?		S9.2-9.4, U9.2-9.4
	Signaling and Screening		U8.11
	Brinkmanship and Commitment	Ch. 14	S14.1, S14.4, U14.1
	Repeated Interaction and Social Interaction		
W6/22 TEST 2	Reward and Punishment	Ch. 10	S10.1-10.2, S10.4, S10.6
	Test covers homework problems from 6/14 through 6/21		
M6/27	Repeated Games & Mutual Sanction		U10.1, U10.3, U10.4
	Social Norms & Third-party Sanction		
	Evolution of Behavior and Belief		
T6/28	Population Dynamics:	Ch. 12	S12.2-12.3, S12.7-12.8
	(1) Replication & Statistical Equilibrium		
	(2) Random Perturbation & Selection		S12.9-12.10
	Evolutionary Stability		U12.1, U12.2, U12.6, U12.8
W6/29 EXAM 2	*Exam covers material from the whole course*		