

# FLORIDA ATLANTIC UNIVERSITY™

UGPC APPROVAL \_\_\_\_\_  
 UFS APPROVAL \_\_\_\_\_  
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 ONLINE \_\_\_\_\_  
 MISC \_\_\_\_\_

## Graduate Programs—NEW COURSE PROPOSAL

DEPARTMENT NAME: ECONOMICS DEPARTMENT      COLLEGE OF: COLLEGE OF BUSINESS

**RECOMMENDED COURSE IDENTIFICATION:**

PREFIX ECO    COURSE NUMBER 6409    LAB CODE (L or C) \_\_\_\_\_

(TO OBTAIN A COURSE NUMBER, CONTACT ERUDOLPH@FAU.EDU)

COMPLETE COURSE TITLE

**ADVANCED GAME THEORY AND APPLICATIONS**

### EFFECTIVE DATE

(first term course will be offered)

SPRING 2010

CREDITS: 3

TEXTBOOK INFORMATION: THE ART OF STRATEGY, DIXIT & NALEBUFF, 2008, W.W. NORTON;  
 THINKING STRATEGICALLY, DIXIT & NALEBUFF, 1991, W.W. NORTON; GAMES OF STRATEGY, DIXIT &  
 SKEATH, 2009, W.W. NORTON; GAME THEORY FOR APPLIED ECONOMISTS, GIBBONS, 1992, PRINCETON UNIV  
 PRESS;

GRADING (SELECT ONLY ONE GRADING OPTION): REGULAR X    PASS/FAIL \_\_\_\_\_    SATISFACTORY/UNSATISFACTORY \_\_\_\_\_

COURSE DESCRIPTION, NO MORE THAN 3 LINES: ADVANCED GAME THEORY AND APPLICATION IS A UNIQUE COURSE THAT COMBINES THEORY WITH PRACTICAL APPLICATIONS TO DEVELOP ANALYTICAL ASTUTENESS IN MANAGERIAL DECISION-MAKING . A STRONG EMPHASIS IS PLACED ON NON-COOPERATIVE GAME THEORY AND BUSINESS APPLICATIONS.

PREREQUISITES W/MINIMUM GRADE:\*

COREQUISITES:

OTHER REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):  
 GRADUATE IN GOOD STANDING

PREREQUISITES, COREQUISITES & REGISTRATION CONTROLS SHOWN ABOVE WILL BE ENFORCED FOR ALL COURSE SECTIONS.

\*DEFAULT MINIMUM GRADE IS D-.

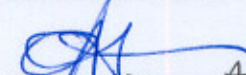
MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE: TERMINAL DEGREE

Other departments, colleges that might be affected by the new course must be consulted. List entities that have been consulted and attach written comments from each.

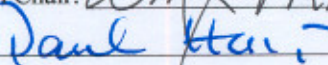
Charles Register, Economics Dept. Chair; [charles.register@fau.edu](mailto:charles.register@fau.edu); 561-297-3220  
 Faculty Contact, Email, Complete Phone Number

### SIGNATURES

Approved by:

Department Chair: 

College Curriculum Chair: 

College Dean: 

UGPC Chair: \_\_\_\_\_

Dean of the Graduate College: \_\_\_\_\_

Date:

9-15-09

9-25-2009

9-25-09

### SUPPORTING MATERIALS

Syllabus—must include all details as shown in the UGPC Guidelines.

Written Consent—required from all departments affected.

Go to: <http://graduate.fau.edu/gpc/> to download this form and guidelines to fill out the form.

Email this form and syllabus to [sfulks@fau.edu](mailto:sfulks@fau.edu) and [egirjo@fau.edu](mailto:egirjo@fau.edu) one week **before** the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website by committee members prior to the meeting.

## **Advanced Game Theory and Applications** **ECO 6409**

**Instructor:** Eric P. Chiang, Ph.D.

**Class Time:** Tues 7:10 – 10:00pm

**Class Location:** TBA

**Office Hours:** Tues/Thurs 4:00 – 7:00pm

**Office Location:** KH 108

**Office Phone:** 561-297-2947

**E-mail:** [chiang@fau.edu](mailto:chiang@fau.edu)

**Website:** [www.ericchiang.org](http://www.ericchiang.org)

**Description:** Advanced Game Theory and Applications is a unique course that combines theory with practical applications. I am confident you will find this course interesting and applicable to many actual business and economic decisions encountered daily.

**Course Objectives:** The goal of this course is to develop analytical astuteness in managerial decision-making. Rather than memorizing math formulas and software coding, a strong emphasis is placed on non-cooperative game theory and business applications. Thus, you will acquire techniques that should extend beyond typical business settings and therefore remain applicable to ordinary situations long into the future.

**Prerequisites:** Graduate Standing. Although the formal mathematical content will not extend beyond simple calculus and optimization, you should be comfortable working with numbers and extensive algebraic calculations. The course will rely heavily on simple quantitative logic and analytical skills.

### **Required Texts:**

*The Art of Strategy* by Dixit and Nalebuff, 2008, W.W. Norton

*Games of Strategy* by Dixit and Skeath, 1<sup>st</sup> Ed, 1999, W.W. Norton

This textbook provides a clear, structured, and interesting discussion on modern game theory topics, many of which we will cover in this course. The text also provides many practice problems, and serves as an excellent reference for many game theory applications that we will not have time to cover.

*Game Theory for Applied Economists* by Gibbons, 1992, Princeton University Press.

Gibbons' book is a more mathematically rigorous introduction to game theory analysis.

### **Required Readings:**

- Abreu, Dilip; Gul, Faruk (2000), "Bargaining and Reputation," *Econometrica*, Vol. 68, pp. 85 – 117.
- Abreu, Dilip (1988), "On the Theory of Infinitely Repeated Games with Discounting," *Econometrica*, Vol. 56, pp. 383 – 396.
- Bagwell, Kyle (1995), "Commitment and Observability in Games," *Games and Economic Behavior*, Vol. 8, pp. 271 – 280.
- Bajari, Patrick; Hortacsu, Ali (2003), "The Winner's Curse, Reserve Prices, and Endogenous Entry: Empirical Insights from eBay Auctions," *Rand Journal of Economics*, Vol. 34, pp. 329.
- Battaglini, Marco (2002), "Multiple Referrals and Multidimensional Cheap Talk," *Econometrica*, Vol. 70, pp. 1379 – 1401.
- Chatterjee, Kalyan; Dutta, Bhaskar.; Ray, Debraj.; Sengupta, Kunal (1993), "A Noncooperative Theory of Coalitional Bargaining," *Review of Economic Studies*, Vol. 60, pp. 463 – 477.
- Kandori, Michihiro; Mailath, George; Rob, Rafael (1993), "Learning, Mutation, and Long Run Equilibria in Games," *Econometrica*, Vol. 61, pp. 27 – 56.
- Kreps, David; Wilson, Robert (1982), "Sequential Equilibria," *Econometrica*, Vol. 50, pp. 863 – 894.
- Kreps, David; Milgrom Paul, Roberts, John; Wilson, Robert (1981), "Rational Cooperation in the Finitely Repeated Prisoners Dilemma," *Journal of Economic Theory*, Vol. 27, pp. 245 – 252.
- Landes, Renee; Rebitzer, James; Taylor, Lowell (1996), "Rat Race Redux: Adverse Selection in the Determination of Work Hours in Law Firms," *American Economic Review*, Vol. 86, pp. 329 – 348.
- Myerson, Roger (1992), "On the Value of Game Theory in Social Science," *Rationality and Society*, Vol. 4, pp. 62 – 73.
- Palacios-Huerta, Ignacio (2003), "Professionals Play MiniMax," *Review of Economics Studies*, Vol. 70, pp. 395 – 415.
- Pool, Robert (1995), "Putting Game Theory to the Test," *Science*, Vol. 267, pp. 1591 – 1593.
- Reiley, David; Urbancic, Michael; Walker, Mark (2008), "Stripped-down Poker: A Classroom Game with Signaling and Bluffing," *Journal of Economic Education*, Vol. 39, pp. 323 – 341.

Reny, Philip (1992), "Rationality in Extensive-Form Games," *Journal of Economic Perspectives*, Vol. 6, pp. 103 – 118.

Roth, Alvin; Ockenfels, Axel (2002), "Last-minute Bidding and the Rules for Ending Second-price Auctions: Evidence from eBay and Amazon Auctions on the Internet," *American Economic Review*, Vol. 92, pp. 1093 – 1103.

Rubinstein, Ariel (1991), "Comments on the Interpretation of Game Theory," *Econometrica*, Vol. 59, pp. 909 – 924.

Rubinstein, Ariel (1982), "Perfect Equilibrium in a Bargaining Model," *Econometrica*, Vol. 50, pp. 97 – 110.

Selten, Richard (1975), "A Reexamination of the Perfectness Concept for Equilibrium Points in Extensive Games," *International Journal of Game Theory*, Vol. 4, pp. 25 – 55.

Varian, Hal (2007), "Position Auctions," *International Journal of Industrial Organization*, Vol. 25, pp. 1163 – 1178.

Vega-Redondo, Fernando; Hasson, Oren (1993), "A Game-Theoretic Model of Predator-Prey Signaling," *Journal of Theoretical Biology*, Vol. 162, pp. 309 – 319.

**Requirements:** In this course, each topic builds upon previous topics in a cumulative fashion; therefore, by missing classes, you will not only miss out on important information on that day, but it will also hinder your ability to grasp future topics. For this reason, full attendance is highly encouraged. **I do not give out notes from previous classes; no exceptions.**

- 1) **Problem Sets:** It is paramount that everybody stays current with each topic. As with any math-oriented course, practice is essential. A set of practice problems will be given each week. These problem sets are due at the beginning of the following class. If you wish, you may complete these exercises with up to two classmates. Absolutely NO assignments will be accepted late, regardless of reason. However, I will drop the lowest score from your grade.
- 2) **In-Class Exams:** There will be a midterm and a cumulative final exam. The exam format is a combination of analytical reasoning exercises along with quantitative problem solving.

**Course Grading:** Your course grade will be determined according to the following weights:  
Problem Sets: 20%; Paper: 20%; Midterm Exam: 30%; Final Exam: 30%

The following is the scale used to assign your final grade:

95% +	= A	80 – 83%	= B-	68 – 69%	= D+
90 – 94%	= A-	78 – 79%	= C+	64 – 67%	= D
88 – 89%	= B+	74 – 77%	= C	60 – 63%	= D-
84 – 87%	= B	70 – 73%	= C-	< 60%	= F

**Note:** You should not expect the use of grading curves in the determination of your final grade.

## **COURSE CONSTITUTION**

**Incompletes:** You are encouraged to speak with me if you are in a situation where you are unable to complete the course. In certain cases, you may be able to make-up part of or the entire course in a future semester. However, this privilege is only given under appropriate conditions. In many cases, the only option will be to drop the class. Failing an exam or unexcused absences is not a valid criterion to receive an incomplete.

**Lateness and Courtesy:** Arriving to class on time shows a lot of respect for your colleagues and to the class. Please arrive on time with all communications devices turned off.

**Students with Disabilities:** In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton – SU 133 (561-297-3880), and follow all OSD procedures.

**Honor Code:** Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [www.fau.edu/regulations/chapter4/4.001 Honor Code.pdf](http://www.fau.edu/regulations/chapter4/4.001%20Honor%20Code.pdf).

**Make-Up Exams:** Every attempt should be made to attend each exam on its scheduled date. However, it is understood that all of us are susceptible to the occasional illness, unfortunate circumstance, or job interview. Thus, if you know that a test date is not feasible for you, you must let me know at least 1 (one) week prior to the test date. Should you be ill or in an unfortunate circumstance on the day of an exam, you must contact me (e-mail or phone) within 48 hours of the exam, and provide documentation within 1 (one) week of the exam. All documentation will be verified for authenticity. Make-up exams will be scheduled at an appropriate time (within one week of the original exam) without penalty. Non-documented excuses or failure to comply by these rules are subject to grade penalties, from 20% up to 100% of the exam grade.

**Instructor's Right to Make Course Modifications:** The course structure and schedule as printed in this syllabus is as accurate as possible. However, the instructor reserves the right to make changes to the rules and schedule listed. In each case, ample notice will be given to the class.

## IMPORTANT DATES

<b>October 13, 2009</b>	<b>Midterm Exam</b>
<b>December 8, 2009</b>	<b>Final Exam</b>

## SCHEDULE OF TOPICS

<b>Week 1</b>	Aug. 25	Overview and Introductions; Introduction to Business Decisions & Game Theory
<b>Week 2</b>	Sept. 1	Sequential-Move Games: Subgame Perfect Equilibrium, Credible Threats, Iterated Strategic Elimination
<b>Week 3</b>	Sept. 8	Non-Cooperative Simultaneous-Move Analysis; Nash Equilibrium and Applications
<b>Week 4</b>	Sept. 15	Non-Nash Outcomes: Focal Points, Non-Rationality, Long-term Strategic Interaction, Trembling-Hand Equilibrium
<b>Week 5</b>	Sept. 22	Nash Equilibrium in Mixed Strategies; Best-Response Functions
<b>Week 6</b>	Sept. 29	Commitment, Credibility, and Reputation in Business Decisions and Management
<b>Week 7</b>	Oct. 6	Probability Theory, Expected Utility, Bayesian Conditional Probability
<b>Week 8</b>	Oct. 13	Midterm Exam
<b>Week 9</b>	Oct. 20	Case Studies in Game Theory
<b>Week 10</b>	Oct. 27	Introduction to Linear Programming: the Geometric and the Simplex Methods
<b>Week 11</b>	Nov. 3	Business Pricing Models—Oligopoly and Duopoly Competition
<b>Week 12</b>	Nov. 10	Negotiation and Bargaining Theory Class Exercises
<b>Week 13</b>	Nov. 17	Information Theory: Principal-Agent Models
<b>Week 14</b>	Nov. 24	Information Theory: The Theory of Contracts; Screening and Signaling Mechanisms
<b>Week 15</b>	Dec. 1	Auction Theory and Applications
<b>Week 16</b>	Dec. 8	Final Exam