ECON 4750: Intro to Game Theory

Prof. Yongsheng Xu
Email: yxu3@gsu.edu
Office: Room 457, AYSPS

It should be noted that this course syllabus provides a general plan for the course and deviations may be necessary.

Important Dates:
- 08/26 – Last Day to add/drop classes
- 09/05 – Labor Day (University official holiday – no classes)
- 10/07 – Last day to Withdraw (www.gsu.edu/es/withdrawals.html for details)
- 11/28 – Project due date
- 12/05 – Last day of lectures
- 12/07 – Final exam

Statement on Academic Honesty: Students are expected to abide by GSU’s policy on academic honesty, which is published in the student handbook. A portion of this policy follows:

“…As members of the academic community, students are expected to recognize and uphold standards of intellectual and academic integrity. The University assumes as a basic and minimum standard of conduct in academic matters that students be honest and that they submit for credit only products of their own efforts... The student is responsible for understanding the legitimate use of resources; the appropriate ways of acknowledging academic, scholarly, or creative indebtedness; and the consequences of violating this responsibility”

If you have questions about academic honesty, please see me.

Location: Room 431, General Classroom Building
Time: Mondays and Wednesdays, 1:30pm-2:45pm
Office Hours: Wednesdays, 10:30am-12pm, and by appointment

Evaluation: Grading will be based on homework assignments (posted on uLearn regularly), two tests, a group project and a final examination (comprehensive) with the following weights:

- Homework Assignments: 15%
- Tests (2): 30% (15% each)
- Group Project: 15%
- Final Exam (Wednesday, Dec 7, 2011; 13:30-16:00): 40%

A letter grade of the following: A+, A, A-, B+, B, B-, C+, C, C-, D and F, will be assigned to you on the basis of your cumulative score. [Solutions to some exercises in the book can be found on the following site: wwnorton.com/books/games_of_strategy.]

Course Policies: Regular attendance is required. No late homework is accepted, no make-up exams are offered. Extenuating circumstances will be handled on an individual basis. (absences, illness, emergencies, etc.) I will offer some opportunities for you to earn extra credits (up to 7 points toward your cumulative score).


Prerequisites: There is no prerequisite for this course. But students should be comfortable with
Course Description and Objectives: Game theory, also known as multi-person decision theory, analyzes situations in which payoffs to players depend on the behavior of other players as well as the player himself/herself. Game theory has found many applications in various fields, such as economics, biology, business, law, politics, sociology, and computer science. The purpose of this course is to introduce the basics of game theory to undergraduate students in various disciplines. It focuses on fundamentals of game theory including basic concepts and techniques, various ways of describing and solving games, and various applications in economics, political sciences, and business. It will help students sharpen their understanding of strategic behavior in different situations involving many individuals. The students will learn how to recognize and model strategic situations, to predict when and how their action will have an influence on others, and to exploit strategic situations for the benefit of their own.

Learning Outcomes: Students should be able (1) to distinguish a game situation from a pure individual’s decision problem, (2) to explain concepts of players, strategies, payoffs, rationality, equilibrium, (3) to describe sequential games using game trees, and to use the backward induction to solve such games, (5) to describe simple simultaneous-move games using game tables, and to explain concepts of dominant, dominated, and rationalizable strategies, pure and mixed strategies, and best responses, (6) to find dominant strategy equilibrium, pure and mixed strategy Nash equilibrium, (7) to describe simple games involving both sequential- and simultaneous-moves, and to explain and to find sub-game perfect Nash equilibrium, (8) to explain concepts of asymmetric information, and to analyze simple signaling games, (9) to analyze repeated games, and to explain the folk-theorem.

Interesting Internet Link(s): Check out the following link which contains many interesting stuff from lecture notes, dictionary, quizzes & tests to game theory in movies and music, and in news: http://www.gametheory.net/students.html.

Course Outline: The following is a rough outline.

Week 1 (Aug. 22, 24). Introduction (Chapters 1 and 2)
  (a) Games and Strategies
  (b) Examples
  (c) Decisions and Games
  (d) Types of Games
  (d) Descriptions of a Game and Its Assumptions

Week 2 (Aug. 29, 31). Sequential Games (Chapter 3)
  (a) Game Trees
  (b) Solving Games
  (c) Some Complications

Weeks 3-4 (Sept 7, 12, 14). Simultaneous-Move Games I: Discrete Strategies (Chapter 4)
  (a) Describing a simultaneous-move game
  (b) Dominant and Dominated Strategies
  (c) Nash Equilibrium
  (d) Best Responses
  (e) Zero-Sum Games
  (f) Three Players
  (g) Multiple Equilibria and Existence of Pure-Strategy Equilibrium
Week 5 (Sept 19, 21). Simultaneous-Move Games II: Continuous Strategies (Chapter 5)
   (a) Pure Strategies
   (b) Nash Equilibrium: Some Further Discussions
   (c) Rationalizability

Test #1: Sept 21 or Sept 26

Week 6 (Sept 26, 28). Combining Sequential and Simultaneous Moves (Chapter 6)
   (a) Multistage Games and Sub-games
   (b) The Order of Moves
   (c) Analyzing Multistage Games

Week 7 (Oct 3, 5). Simultaneous-Move Games III: Mixed Strategies (Chapters 7,8)
   (a) Mixed Strategies
   (b) Probabilities and Expected Utility
   (c) Risk Attitudes
   (d) Best-Responses and Nash Equilibrium in Mixed Strategies
   (e) Average-Payoff Analysis and Nash Equilibrium in Mixed Strategies

Week 8 (Oct 10, 12). Uncertainty and Information (Chapter 9)
   (a) Risk
   (b) Asymmetric Information
   (c) Cheap Talk
   (d) Adverse Selection, Signaling and Screening
   (e) Equilibrium in Signaling Games

Week 9 (Oct 17, 29). Strategic Moves (Chapter 10)
   (a) Types of Strategic Moves
   (b) Credibility and Commitments
   (c) Promises and Threats

Week 10 (Oct 24, 26). Repeated Games (Chapter 11)
   (a) The Prisoners' Dilemma
   (b) Repetition
   (c) Penalties and Rewards
   (d) Examples

Week 11 (Oct 31, Nov 2). Collective-Action Games (Chapter 12)
   (a) Two Players
   (b) Large Groups
   (c) Solving the Games
   (d) Externalities

Test #2: Nov 2 or Nov 7

Week 12 (Nov 7, 9). Evolutionary Games (Chapter 13)
   (a) Description
   (b) Prisoners' Dilemma
   (c) Chicken
   (d) The Assurance Game
   (e) The Hawk-Dove Game
   (f) Cooperation and Altruism

Week 13 (Nov 14, 16). Mechanism Design (Chapter 14)
(a) Basic Ideas
(b) Examples
(c) Some Applications—Incentives in Teams

Week 14 (Nov 21, 23). Thanksgiving Holiday, No classes.

Project Due: Nov 28

Week 15 (Nov 28, 30). Auctions (Chapter 17)

Week 16 (Dec 5, 7). Review (Dec 5) and Final Exam (Wednesday, Dec 7, 1:30pm-4:00pm)