

# ISyE 8801B

## Game Theory

Fall 2003

### Administrative Info

**Instructor:** Anton J. Kleywegt  
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**Class Room:** IC207

**Class Times:** Mondays & Wednesdays 4:30pm–6:00pm

### Description:

The course covers some of the basic results in game theory, and the mathematical background, beyond the prerequisite knowledge for the class, that underly the proofs of these results. Material covered in the class will overlap somewhat with the material of other classes such as ISyE6230, but the overlap will be kept small. The emphasis in the class will be on a better understanding of some technical aspects of game theoretical results and their proofs, and not as much on the economic interpretation of the results.

**Objectives** of the course are

- to develop a familiarity with some basic results in game theory;
- to develop a familiarity with some mathematical tools and proof techniques used in game theory;
- to understand the assumptions and the limitations of results in game theory;
- to develop the ability to read papers involving game theory, and to understand the technical parts of the papers.

**Prerequisites:**

Previous exposure to real analysis will be important (concepts such as supremum, infimum, convergence, contraction mapping). The extensions of some results use measure theory. Some familiarity with convex sets and convex functions will be important.

**Textbook:**

There is no required text for the class. Some useful references are given below.

**References:**

- Aliprantis, C. D. and Chakrabarti, S. K., *Games and Decision Making*, Oxford University Press, New York, 2000.
- Border, K. C., *Fixed Point Theorems with Applications to Economics and Game Theory*, Cambridge University Press, Cambridge, 1985.
- Dixit, A. and Skeath, S., *Games of Strategy*, W.W. Norton & Company, New York, 1999.
- Filar, J. A. and Vrieze, K., *Competitive Markov Decision Processes*, Springer-Verlag, New York, 1996.
- Friedman, J. W., *Game Theory with Applications to Economics*, Oxford University Press, New York, 1986.
- Friedman, J. W., *Oligopoly and the Theory of Games*, North-Holland, Amsterdam, 1977.
- Fudenberg, D. and Levine, D. K., *The Theory of Learning in Games*, MIT Press, Cambridge, MA, 1998.
- Fudenberg, D. and Tirole, J., *Game Theory*, MIT Press, Cambridge, MA, 1991.
- Gibbons, R., *Game Theory for Applied Economists*, Princeton University Press, Princeton, 1992.
- Jones, A. J., *Game Theory: Mathematical Models of Conflict*, Chichester, England, 2000.
- Kreps, D. M., *Game Theory and Economic Modelling*, Oxford University Press, Oxford, 1990.
- Luce, R. D. and Raiffa, H., *Games and Decisions*, Dover Publications, New York, 1957.
- Mas-Colell, A. and Whinston, M. D. and Green, J. R., *Microeconomic Theory*, Oxford University Press, New York, 1995.
- Myerson, R. B., *Game Theory*, Harvard University Press, Cambridge, MA, 1991.

Owen, G., *Game Theory*, Academic Press, San Diego, 1995.

Rapoport, A., *N-Person Game Theory*, University of Michigan Press, Ann Arbor, 1970.

Shubik, M., *Game Theory in the Social Sciences: Concepts and Solutions*, MIT Press, Cambridge, MA, 1982.

Von Neumann, J. and Morgenstern, O., *Theory of Games and Economic Behavior*, Princeton University Press, Princeton, 1980.

Vorobyev, N. N., *Game Theory: Lectures for Economists and Systems Scientists*, Springer-Verlag, New York, 1977.

### **Grading:**

Grades will be assigned as follows:

- Homework: 30%
- Midterm exam: 30%
- Final exam: 40%

### **Homework:**

Homework will be assigned approximately once every two weeks. You should start working on each homework early, that way you will have time to ask questions in class before the homework is due. Late homework will be accepted only in case of unavoidable occurrences, such as illness or death in the family. You are encouraged to discuss homework and learn from each other, but each person must submit his/her own work, unless the homework specifically indicates that you should work in groups. Any queries on homework grades must be submitted in writing to the instructor, together with the homework in question.

### **Exams:**

Exams will cover material discussed in class, as well as reading assignments and homeworks. The exams will be comprehensive. The midterm exam is scheduled for Wednesday October 8, 2003, in class. The midterm exam will be closed book. Any queries on exam grades must be submitted in writing to the instructor, together with the exam in question. Missing an exam will be accommodated only in case of unavoidable emergencies, and the instructor must be notified of the emergency as soon as possible. If you cannot take an exam at the designated time or in the designated way, you should make alternative arrangements with the instructor as soon as possible.

### **Academic Honor Code:**

It is your responsibility to familiarize yourself with the Georgia Tech Honor Code. Specifically, you must do your own work in all homeworks and exams; when homework is specifically assigned as group homework you may and should work with the other members of your group.