Attila Ambrus
Economics 620
Game Theory with Applications Fall 2019

SYLLABUS

Location of Class: Social Sciences 119
Meeting Time: Mon., Wed. 10.05-11.20 am
Attila’s Office hours: Wednesday 1-2.15 pm, Social Sciences 313
Attila’s phone and e-mail: 919-660-1835, aa231@duke.edu
TA: Luke Zhao, email: luke.zhao@duke.edu
TA’s Office Hours: Tuesday 5-6pm Social Sciences 327

Text Books

Each of the following books provides a good background reading for the lecture material:

R. Gibbons: Game theory for applied economists, Princeton University Press 1992
ISBN 0-691-00395-5 (PB)

ISBN 0-262-04169-3

ISBN 1-4051-3666-9
(Not printable chapters are available online: http://www.rasmusen.org/GI/index.html)

Grading

Problem Sets 20%
Midterm 30%
Final 50%

Requirements: who should take this course?

This course is an introduction to game theory. For MA students, no formal prerequisite is required. We will use calculus (mostly, one variable) and some probability theory.
Course Aims and Methods

Game theory is a way of thinking about strategic situations. On the one hand its content is normative: it provides guidelines for decision makers to predict others’ actions and to recognize good and bad strategies. On the other hand its content is positive: it helps the social scientist to understand the nature of social interaction in various applications, in Economics, Political Science, Sociology and Anthropology. We will learn new concepts, methods and terminology. The course will emphasize examples and applications. We will also play some games in class.

Outline and Reading

The readings are not compulsory, but they will help back up the class material. 
G=Gibbons; D=Dutta; R=Rasmusen

**Topic 1** (Aug 26) Normal form games: basic concepts; Dominated strategies 
Reading: G: 1.1.A, 1.1.B; D: 1.1-1.3, 2.3; R: 1.1, 1.2

**Topic 2** (Aug 28, Sep 2) Iterated dominance; Best responses; Rationalizability; Knowledge, common knowledge 
Reading: G: 1.1.B; D: 2.1, 3-4; R: 1.3, 2.2

**Topic 3** (Sep 4, 9, 11) Nash equilibrium; Finding pure strategy Nash equilibria in finite games; Applications: Cournot and Bertrand duopoly, voting games, partnership game 
Reading: G: 1.1.C; D: 5; R: 1.4, 3.5, 3.6

**Topic 4** (Sep 16, 18, 23) Mixed and correlated equilibria; Large populations; Tipping points; Evolutionary stability 
Reading: G: 1.2.A-1.2.B; D: 6-7; R: 5.6

**Topic 5** (Sep 25, 30) Extensive form games; Backward Induction; Zermelo’s algorithm; Incredible threats; Counter-intuitive predictions of backward induction 
Reading: G: 1.3.A-B; D: 8-9; R: 2.1

**Topic 6** (Oct 2) Applications: alternative-offer bargaining; Game of duel 
Reading: G: 2.1.D; D: 11-12; R: 12.1-12.4

**Topic 7** (Oct 9, 14, 16) Imperfect information; Subgame perfect Nash equilibrium: theory and applications; War of attrition 
Reading: G: 2.2.A; D: 13; R: 3.2, 4

**Midterm: Monday October 21 (in class)**

**Topic 8** (Oct 23, 28) Bayesian games; Cournot duopoly with private information; Perfect Bayesian Nash equilibrium and sequential equilibrium
Reading: G: 3.1, 3.2, 4.1; D: 21, 24.2; R: 6.1, 6.2

**Topic 9** (Oct 30) Reputation
Reading: G: 4.3.C; R: 5.3-5.4, 6.4

**Topic 10** (Nov 4, 6) Finitely repeated games; Renegotiation; One-step deviation property; Infinitely repeated games
Reading: G: 2.3.A; D: 13-14; R: 5

**Topic 11** (Nov 11, 13) Private information; Verifiable information; Costly signaling
Reading: G: 2.3.A, 4.2, 4.3.C; D: 15-18, 24; R: 11

**Topic 13** (Nov 18, 20) Auctions: common values and private values; Winner’s curse; Revenue equivalence
Reading: G: 3.2.B; D: 23; R: 13

November 25: Review session.