

PSC 393: Game Theory and Politics

Department of Political Science
University at Buffalo
Spring 2010

Prof. Frank C. Zagare
504 Park Hall
FCZagare@buffalo.edu

Description:

This course provides an introduction to game-theoretic models in political science, with a special, though not exclusive, emphasis on applications of these models to international politics. It examines political, military, and economic choices under conditions of certainty, risk, and uncertainty. Topics include game-theoretic treatments of battles and warfare, arms races, crises, deterrence, superpower conflict, international negotiations, power, and alliance and coalition politics.

Required Texts:

Avinish Dixit and Barry Nalebuff, *The Art of Strategy*. New York: Norton, 2008.

William Poundstone, *Prisoner's Dilemma*. New York: Anchor Books, 1992.

Philip Straffin, *Game Theory and Strategy*. Washington, DC: Mathematical Society of America, 1995.

Frank C. Zagare, *Game Theory: Concepts and Applications*. Beverly Hills, CA: Sage, 1984.

Zagare, Frank C. and D. Marc Kilgour, *Perfect Deterrence*. New York: Cambridge University Press.

Requirements:

There will be two or three examinations based on the assigned readings *and* the material covered in class. The examinations will count for 80% - 90% of the final grade. *There are no make-ups!* Missed examinations will be graded for no credit and averaged. All exams will be in-class.

Students are expected to attend class and keep up with the reading assignments. Students should be prepared to discuss the reading assignments in class. Classroom participation, including attendance and homework assignments, will count for up to 20% of the final grade. Homework assignments should be typed.

It is in the world of things and places, times and troubles and turbid processes, that mathematics is not so much applied as *illustrated*.
David Berlinski, *A Tour of the Calculus*

The following is a chronological list of topics and suggested readings. The amount of time spent on each topic depends on the ability of the class to absorb and understand the material.

I. Introduction

Dixit and Nalebuff, Chapter 1
Poundstone, Chapters 1 – 2
Zagare, “Introduction”
Straffin, Chapters 10 and 33
Handout: “The Game Theorist”*
Handout: “Game Theory Wins a Nobel”*
Handout: The Battle of the Bismarck Sea*

II. Representing Games I: The Extensive Form

Dixit and Nalebuff, Chapter 2
Poundstone, Chapter 3
Zagare, pp. 11 – 15
Straffin, Chapter 7

III. Representing Games II: The Normal Form

Poundstone, Chapter 4
Zagare, pp. 16 – 21
Homework 1*
“Extensive Form of Asymmetric Escalation Game”*

IV. Two-Person Zero-Sum Games

Dixit and Nalebuff, Chapters 3 and 7
Poundstone, Chapter 5
Zagare, Chapter 2
Straffin, Chapters 1 – 6, and 8
Homework 2 and 3*

V. Introduction To Utility Theory

Straffin, Chapter 9

VI. Two-Person Nonzero-Sum Non-cooperative Games

Dixit and Nalebuff, Chapters 4 – 6 and 8 – 13
Poundstone, Chapters 6 – 11
Straffin, Chapters 11 – 15
Zagare, Chapter 3

VII. The Theory Of Metagames

Straffin, pp. 76 – 78

Poundstone, pp. 226 – 28

Zagare and Kilgour, Section 2.5

VIII. Analysis Of Options

Michael C. Shupe et al., (1980). “Nationalization of the Suez Canal,” *Journal of Conflict Resolution*, 24: 477-93.#

IX. Evolutionary Stable Strategies

Poundstone, pp. Chapter 12 – 13

Straffin, pp. 78 – 79

*“The Importance of Being Nice”

X. The Theory of Moves

Steven J. Brams, “Game Theory and the Cuban Missile Crisis,” *Plus Magazine*, Jan. 24, 2001.*

Frank C. Zagare, “A Game-Theoretic Evaluation of the Cease-Fire Alert Decision of 1973,” *Journal of Peace Research*, 20, number 1 (April 1983), pp. 73 – 86.*

XI. Incomplete Information Games

Zagare and Kilgour, Chapters 1 – 5, and 10.

XII. Voting Games

Straffin Chapter 20

Zagare, p. 64 – 71

Frank C. Zagare, “A Game-Theoretic Analysis of the Vietnam Negotiations: Preferences and Strategies, 1968-1973,” *Journal of Conflict Resolution*, 21 (December 1977), pp. 663 – 84. #

*Homework 4

XIII. Two-Person Nonzero-Sum Cooperative Games

Straffin, Chapters 16 – 17

XIV. Introduction to N-Person Games

Zagare, pp. 71 – 82

Straffin, Chapters 19, 21 – 25, and 29

*“Harvard is Lone Bidder”

XV. Coalition Theory

Zagare, pp. 82-85

Straffin, Chapter 30

*“The Rochester School”

XVI. Power Indices

Zagare, pp. 85-90

Straffin, Chapters 26 – 28



= available at: <http://www.jstor.org/>

* = available at: <http://pluto.fss.buffalo.edu/classes/psc/fczagare/GameTheoryHome.htm>



Game Theory on the Internet: Some Places To Start

Name: Game Theory.Net **Address:** <http://www.gametheory.net/>

This is a comprehensive site that has material for both the beginning and the advanced student of game theory. It is perhaps the best such site on the internet. The links for educators include teaching materials, lecture notes, books and articles; and for students there is a dictionary of terms, selected applications, and course reviews. There are also links to music and movies that make use of game-theoretic concepts.

Name: Game Theory Website v2.0 **Address:**

http://www.holycross.edu/departments/biology/kprestwi/behavior/ESS/ESS_index_frmset.html

This site, which is designed for undergraduates, provides an introduction to evolutionary game theory. Although primarily of interest to those with an interest in animal behavior, it provides a fascinating exposition of the Hawk vs. Dove Game that may be of interest to some students of interstate conflict

Name: Gambit **Address:** <http://gambit.sourceforge.net/>

Gambit is a software program that can be used to construct and solve finite extensive- and strategic-form games. It can be downloaded from this website. Tutorials for using the program are also available here.

Name: David Levine's Economic and Game Theory **Address:** <http://levine.sscnet.ucla.edu/>

Last accessed: February 21, 2009

Contains a general introduction to the modern theory of games with interesting examples, suggestions for further reading and reviews of a number of game theory texts.

Name: Al Roth's Game Theory, Experimental Economics, and Market Design Page

Address: <http://kuznets.fas.harvard.edu/~aroth/alroth.html>

Last accessed: February 23, 2009

Large archive with notes, papers, and links to other sites using game theory, experimental economics. Maintained by Al Roth.

Name: Game Theory and Information

Address: <http://econpapers.repec.org/paper/wpawuwpga/>

Last accessed: February 23, 2009

Archive with working papers on current game-theoretic and economics research.

Name: Ariel Rubinstein's Website

Address: <http://arielrubinstein.tau.ac.il/>

Last accessed: February 23, 2009

Free downloads of Rubinstein's books, including "Bargaining and Markets" and "Modeling Bounded Rationality"
