

Thinking Analytically for Policy and Decisions

NRE 575, PubPol 500, Law 796
University of Michigan

FALL 2008

[revised 10 September 2008]

Class Meetings: MW 1:05 – 2:25, Dana (SNRE) Room 1028
Optional review/discussion section, F 1:05 – 2:25, Dana 1028
(Examination date and time: Thursday, December 11, 4:00 – 6:00)

Law students note: This course follows the University, not the Law School, academic calendar. The only difference is that the final class meets on Monday, Dec 8 (one class after law school classes end)

Professor Ted Parson
parson@umich.edu

Law School Office: Hutchins Hall 432, 763-6133
Secretary: Mrs. Laura Harlow, HH 405, 763-0957, harlowL@umich.edu

SNRE Office: Dana 3548, 647-2437

Professor's Office Hours:

at Law School: Tuesday, 9:00 a.m. – 10:30 a.m.
at SNRE: Monday, 2:30 p.m. – 4:00 p.m.

GSI Office Hours*:

Wed. 2:45 - 3:45 (after class)
Thurs. 11:30 - 12:30

GSI: Josh Brammer – brammer@umich.edu

* in Weill 3208

Course Description

The course will develop the skills of using analytic methods and models to understand real decisions and policy issues, drawn from the realms of natural resource management, public policy, business strategy, politics, negotiations, and conflict.

The perspective will be that of a decision-maker seeking better understanding of complex situations she/he faces in managerial and professional life, and practical guidance for making decisions in these situations.

The course will consider a variety of analytic techniques, methods, and models, particularly those emphasizing uncertainty and strategic interactions in decision-making. Some elementary concepts of modeling will also be introduced, with emphasis on dynamics, uncertainty, and optimal choice under constraints.

The emphasis throughout is on fundamental concepts, insights, and intuitions, often drawing the practical material for our discussions from current issues and controversies that we find in the newspaper. Formalism and computation will be kept to the minimum necessary to convey the basic concepts.

We will in particular practice basic skills of abstraction and formulation: recognizing situations where some simple analytic concept is potentially applicable to some messy reality; abstracting the essential characteristics of the messy reality to develop a relevant model; and critically examining the model's implications in light of our understanding and judgments about

the messy reality. We will often move iteratively between thinking about complex messy realities and simple models, using each perspective to probe, critique, and improve our understanding from the other perspective.

Intended Student Audience and Prerequisites:

The course aims to be valuable to students with a wide range of prior training and experience. Its main target audience is graduate students in professional schools, and it is designed to be accessible to these students regardless of their mathematical background.

The only prerequisites for the course are an inquiring mind, energy, and a sense of humor. The lectures emphasize conceptual rather than technical material, with additional technical material provided as optional readings. Students are welcome with backgrounds ranging from high-school algebra through to prior graduate study in quantitative disciplines such as economics, engineering, or operations research.

Clearly, your experience in the course, what you get out of it, and what level of effort is required of you, will all depend on where you fall in this distribution of prior training. If you have only high-school algebra, you may take the course and you can succeed at it, but you must be prepared to work hard. Extra review sessions will be provided early in the semester to help you check and upgrade your background skills.

If you have one semester of prior study of microeconomics, statistics, and calculus (or two out of three), you are right where the course is targeted. Note, however, that while this level of prior preparation is helpful, it is not required – either to take the class, to learn a lot, or to perform well. Class discussion will usually assume this level of prior knowledge, with a little explanation on the side to help those without this background to understand what we are doing. For you, the aim of the course is to build powerful new thinking skills first at a relatively informal, intuitive level; and to persuade (even excite) you about the power of these approaches to improve your understanding and effectiveness, whatever the substantive domain of your future profession. Some of you may find that after completing this course, you want to take more advanced and formal courses in some of the approaches and methods we discuss.

If you already have lots of advanced training in statistics and economics, the course may still be useful to you – depending on how effectively your prior training has exercised your intuitions and skills of abstraction, in addition to your ability to do computations. (Since much advanced training sacrifices the former for the latter, such students often find the course both useful and fun.) You will be in the minority in the course, but I will make sure to throw out frequent challenges for you to chew on.

We will provide GSI-led review sessions for extra help, and organize study groups that cross substantive/professional interests and levels of prior formal training. There will be some expectation that those with stronger preparation will jointly enhance their own and others' learning through collaboration in study groups.

Requirements and Grading:

- Contribution to class discussion, plus occasional brief in-class assignments (problems of the day, class notes): 15%
- 3 problem sets: 45%
- Final exam: 40%

Textbooks and Reading Materials

Required

Edith Stokey & Richard Zeckhauser, *A Primer for Policy Analysis*, Norton, 1978.

Avinash Dixit and Barry Nalebuff, *Thinking Strategically* Norton, 1991. (Great examples, good non-formal exposition of basic game-theoretic concepts)

Additional required reading packets will be distributed in the Law School reading room.

Additional Relevant books of interest (for reference and extra reading):

For decisions under uncertainty:

Howard Raiffa, *Decision Analysis*

R. Duncan Luce and Howard Raiffa, *Games and Decisions*

H. M. Taylor and S. Karlin, *An Introduction to Stochastic Modeling*

For dynamics, optimization, and modeling:

John Harte, *Consider a Spherical Cow: A Course in Environmental Problem Solving*

Alpha C. Chiang, *Fundamental Methods of Mathematical Economics*

Colin W. Clark, *Mathematical Bioeconomics: The Optimal Management of Renewable Resources*

Frederick S. Hillier and Gerald J. Lieberman, *Introduction to Operations Research*

R. K. Sundaram, *A First Course in Optimization Theory*

For Game Theory:

A.K Dixit and S. Skeath, *Games of Strategy* Norton.

Robert Gibbons, *Game Theory for Applied Economists*

David M. Kreps, *A Course in Microeconomic Theory* (an elegantly presented graduate economics text with an emphasis on game theory)

Roger B. Myerson, *Game Theory* (a contemporary but advanced text)

Thomas Schelling, *Micromotives and Macrobehavior* (an elegant presentation of interactive models applied to policy)

Richard Thaler, *The Winner's Curse* (highly readable and full of fun-filled facts)

Thinking Analytically for Policy and Decisions
NRE 575, PUBPOL 500, LAW 796
University of Michigan, Fall 2008
SYLLABUS OUTLINE

	<u>Class Date</u>	<u>Topic</u>	<u>Assignment</u>
<i>Course Introduction</i>			
Week 1	Mon 09/01/08	No class: Labor Day	
	Wed 09/03/08	Introduction to Decisions, Modeling, and Analytic Thinking	
	Fri 09/05/08	<i>Optional review:</i> Introduction to Probability	
<i>Decisions Under Uncertainty (9 Classes)</i>			
Week 2	Mon 09/08/08	Uncertainty basics	
	Wed 09/10/08	Uncertainty - first applications	
	Fri 09/12/08	<i>Optional review:</i> Conditional Probability and Imperfect Tests	
Week 3	Mon 09/15/08	Choice Under Uncertainty Intro: Decision Trees, Exp Value Choice	
	Wed 09/17/08	Decision Trees, Expected Value Choice continued	
	Fri 09/19/08	<i>Optional review:</i> Random Variables and Their Distributions	
Week 4	Mon 09/22/08	Value of Information	
	Wed 09/24/08	Option Value and Adaptive Management	
	Fri 09/26/08	<i>Optional review:</i> Value of Information Calculations	
Week 5	Mon 09/29/08	Valuing Outcomes: Utility, and Risk Aversion	
	Wed 10/01/08	Life Threatening Risks, value of life	
	Fri 10/03/08	<i>Optional review:</i> Math Foundations for Dynamic Systems	
Week 6	Mon 10/06/08	Insurance, policy responses to Risks	

Thinking Analytically for Policy and Decisions
NRE 575, PUBPOL 500, LAW 796
University of Michigan, Fall 2008
SYLLABUS OUTLINE (Con't)

	<u>Class Date</u>	<u>Topic</u>	<u>Assignment</u>
<i>Modeling Concepts for Decision Making (6 Classes)</i>			
Week 6	Wed 10/08/08	Basic concepts of dynamic systems	
	Fri 10/10/08	<i>Optional review:</i> Topic TBD	Problem Set #1 (Uncertainty) Due
Week 7	Mon 10/13/08	Dynamic Systems Applications, Stochastic Processes	
	Wed 10/15/08	Stochastic Processes Applications: Heterogeneity	
	Fri 10/17/08	<i>Optional review:</i> spreadsheet simulations, elementary calculus	
Week 8	Mon 10/20/08	No class: Fall Break	
	Wed 10/22/08	Basic Concepts of Optimization	
	Fri 10/24/08	<i>Optional review:</i> Calculus Continued, Mechanics of Optimization	
Week 9	Mon 10/27/08	Dynamic Optimization	
	Wed 10/29/08	Dynamic Optimization	
	Fri 10/31/08	<i>Optional review:</i> TBD	
<i>Strategic Decisions: Game Theory and Its Applications (10 Classes)</i>			
Week 10	Mon 11/03/08	Basic Concepts of Game Theory	
	Wed 11/05/08	Basic Concepts of Game Theory	
	Fri 11/07/08	<i>Optional review:</i> TBD	ProbSet #2 (Dynamics & Opt'n) Due
Week 11	Mon 11/10/08	Mixed Strategies	
	Wed 11/12/08	Coordination and Cooperation Games	
	Fri 11/14/08	<i>Optional review:</i> TBD	
Week 12	Mon 11/17/08	Credibility and Commitments	

	Wed	11/19/08	Credibility and Commitments
	Fri	11/21/08	<i>Optional review: TBD</i>
Week 13	Mon	11/24/08	Games with Uncertainty
	Wed	11/26/08	Games with Uncertainty
	Fri	11/28/08	No Class: Thanksgiving Break
Week 14	Mon	12/01/08	Games Society Plays
	Wed	12/03/08	Overflow and Additional Strategic Decision Making Applications
classes end	Fri	12/05/08	<i>Optional review: TBD</i>
Last Class	Mon	12/08/08	Wrap-up: The Power of Analytic Thinking, Maxims for Professional Life

Problem Set #3 (Game Theory) Due

Thinking Analytically for Policy and Decisions
(NRE 575, Law 796, PubPol 500)
Detailed Schedule of Topics and Readings
As of: 27 August 2008

pk=packet, ct=course tools

1. Course Introduction

Wed, Sept. 3: Introduction to decisions, modeling, and analytic thinking

Reading:

- (bk/ct intro) Stokey and Zeckhauser, Ch 1 and 2, pp. 3-21
- (pk 1/ct 1) Schelling, *Micromotives and Macrobehavior*, Ch 1 and 2 (“Micromotives and Macrobehavior,” and “The Inescapable Mathematics of Musical Chairs”)
- (pk 1/ct 2) J.L. Adams, “Introduction,” and “Perceptual Blocks,” Chapters 1 and 2, in *Conceptual Blockbusting*, pp. 1-11, 13-37. **Optional but great fun.**

Fri, Sept. 5 Review session (Optional): Introduction to Probability

Elementary probability relationships: AND, OR, NOT, mutual exclusivity
Calculating probabilities by counting sample points: various rules
Conditional probability, independence

Readings for first three Friday review sessions

- (pk 1/ct 4) Harold Pollack, “Notes on Probability”, pg. 1-13
- (pk 1/ct 5) “Handedness, politics, gender,”
- (pk 1/ct 7) Wackerly, Mendenhall, and Scheaffer, *Mathematical Statistics with Applications*, 6th edition. Chapter 2, “Probability” pp. 19-76. (*A systematic exposition of elementary probability for those who need it.*)
- (pk1/ct 3) Ki-Seok Ko, “Notes on Math Basics” (Not explicitly covered but sections of this may be useful at various points through the semester)

2. Decisions under Uncertainty, Individual and Social: (9 classes)

Mon, Sept. 8, Wed Sept 10: Uncertainty – Meaning and First Applications

Foundations of probability: relative frequency vs subjective belief
(Applications: last week’s game; global warming)
Representing events as trees: conditional probability
Imperfect tests
(Application: screening mammography for women in their 40s)
Conditional Independence: False coins, Let’s Make a Deal

Reading:

- (pk 1/ct 8) “Screening for breast cancer”

- (ct 23/23a) Gina Kolata, "Mammogram talks prove indefinite", *New York Times*, Jan 24, 1997, p. A1.
 Gina Kolata, "New Mammogram Studies Divided on Benefits," *New York Times*, Sept. 3, 2002, p. 7.
- (pk 1/ct 10) K. Antman and S. Shea, "Screening Mammography Under Age 50," *Jrnl of the American Medical Association*, v. 281, April 28, 1999, pp. 1470-1472.
- (pk 1/ct 11) John Tierney, "Behind Monty Hall's Doors: Puzzle, Debate, and Answer?" *New York Times*, July 21, 1991, pg. A1.
- (pk 1/ct 12) I. Stewart, "The Interrogator's Fallacy" *Scientific American* Sept 1996, p. 173-175

Fri, Sept. 12 Review session (Optional):

More on Conditional Probability, Bayes calculations.
 Further applications to imperfect tests: drugs, polygraphs

Reading:

- (pk 1/ct 6) "Prizes, Class Offices, Staffing a Committee"

Mon Sept. 15, Wed Sept 17: Decisions under Uncertainty Introduction: Decision Trees, Expected-Value Choice

Decision trees: structure and notation
 Choices, uncertain events, endpoints
 Expected value

Reading:

- Stokey and Zeckhauser Ch. 12, "Decision Analysis"
 (pk 2/ct 13) Mimeos, "Drilling for Oil" and "Earthslides"

Fri, Sept. 19: Review session (Optional): Random variables and their distributions

Discrete and continuous random variables
 Distributions: density functions and cumulative distributions
 Summary measures: expected value, variance

Reading:

- (pk 2/ct 22) Wackerly, Mendenhall, and Scheaffer, *Mathematical Statistics with Applications*, 6th edition. Chapter 3, "Discrete random variables and their probability distributions, sec 3.1-3.3. pp. 83-97

Mon, Sept. 22: Value of Information

No additional reading

Wed, Sept. 24: Option Value, Adaptive Management

Reading:

- (pk 2/ct 24) Dixit and Pindyck, *Investment Under Uncertainty* Chapter 1.
- (pk 2/ct 24a) Dixit and Pindyck, *Investment Under Uncertainty* Chapter 2.
- (pk 2/ct 25) Hammitt, J.K., R.J.Lempert, M.E.Schlesinger. 1992. "A Sequential-Decision Strategy for Abating Climate Change." *Nature* 357, 315-18
- (pk 2/ct 14) J. Hirshleifer and J.G. Riley, *The Analytics of Uncertainty and Information*. New York: Cambridge University Press, 1992. Chapter 5, "Information and informational decisions", pp. 167-223 **Optional, more advanced**

Fri, Sept 26: Review session (Optional):

Value of information calculations

Mon, Sept. 29: Valuing Outcomes, Utility and Risk Aversion

Alternatives to expected monetary value: Von Neumann-Morgenstern utility
Utility functions for monetary payoffs: Risk aversion
Stochastic dominance

Reading:

- Stokey Zeckhauser, Ch.8, Defining Preferences; Ch. 12 Appendix, Utility Theory.
- (pk 2/ct 15) Mimeo, "When will you gamble?"
- (pk 2/ct 16) Hirshleifer and Riley, *Analytics of Uncertainty and Information*. Ch 1, "Elements of decision under uncertainty", pp. 7-42 **Optional, more advanced**

Wed, Oct. 1: Life-Threatening Risks, Value of Life

Risky decisions, implied value of life
Example: Howard's "black pill/white pill" experiment
Policy responses to risk: private and public insurance markets, regulation, liability, financial markets.

Reading:

- (pk 2/ct 21) T.C. Schelling, "The Life you save may be your own", Ch. 5 (pp. 113-146) in *Choice and Consequence: Perspectives of an Errant Economist*
- (pk 2/ct 17) Mimeo, "A Presumptuous Question"
- (pk 2/ct 18) R.L Keeney, "Understanding Life-Threatening Risks," *Risk Analysis*, v.15 n.6, 1995, p. 627-637.
- (pk 2/ct 19) R. A. Howard, 1980, "On Making Life and Death Decisions," in *Readings on the Principles and Applications of Decision Analysis*, R. Howard and J. Matheson (Eds.), pp.483-500.
- (pk 2/ct 20) M. Kinsley, "Less Cost, More Risk," *Time*, July 15, 1996, p.46.

Fri, Oct 3: Review session (Optional):

Math foundations for dynamic systems, difference equations.

(pk 2/ct 26) “Discounting: Coal vs. Nuclear”

Mon, Oct 6: Insurance, Policy Responses to Risk

Basic concepts of insurance (definitions, student apartment insurance example)
Adverse selection and moral hazard;
When, how, and what to insure: maximizing expected utility
Risky work; Grandma’s Portrait; life insurance for your child
Public versus private provision, insurance vs risk reduction (climate change)
Catastrophic risks and other limits to insurance systems.

Readings:

- (pk 2/ct 27) D. Cutler and R. Zeckhauser, “The Anatomy of Health Insurance”, Ch. 11 in *Handbook of Health Economics*, Vol 1A, ed. Culyer and Newhouse.
(pk 2/ct 28) Howard Kunreuther, “Limited Knowledge and Insurance Protection”, *Public Policy* 24:2, Spring 1976, pp. 227-261
(pk 2/ct 29) H.B. Leonard and R.J. Zeckhauser, “Public Insurance Provision and Non-Market Failure”. *Geneva Papers on Risk and Insurance* 8:27, April 1983, 147-157

3. Modeling Concepts for Decision-Making: (6 classes)

Wed, Oct 8: Basic Concepts of Dynamic Systems

Defining dynamic systems: Stocks and flows.
Representing dynamic systems: graphically, algebraically (difference equations)
Exponential growth and decline: doubling times, half-lives
Equilibrium: stable vs unstable; interpretation of multiple equilibria

Readings:

- Stokey & Zeckhauser, Chapter 4, “Difference Equations.”
(Packet 3) mimeo, “Inflation, Radioactive Waste, etc.”
(Packet 3) Jay Forrester, “Principles of Systems”, Ch. 1. MIT Press.
(Packet 3) John Sterman, *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Ch 7, 8.

Fri, Oct 10: Review session (Optional): Topic TBD

Problem Set 1 (Uncertainty) Due Fri Oct 10, 5:00 PM

Mon, Oct 13: Dynamic Systems applications, Stochastic Processes

Basic concepts: States, transition rules
Markov chains, Random Walks
Applications

Readings:

- (Packet 3) mimeo, “A Global Model of Whales”

- Stokey and Zeckhauser, "Markov Models," Ch. 7, pp. 98-114.
 (Packet 3) mimeo, "Markov Chains: Motivational Introduction"
 (Packet 3) mimeo, "Markov Chains"
 (Packet 3) Harte Ch. 4, "Stability and Feedback", pp. 85-140 (Optional Reading)

Wed, Oct 15: Stochastic processes applications: Heterogeneity

Simulating stochastic processes in spreadsheets;
 Applications to epidemics, innovations, and revolutions
 Unobserved heterogeneity; Hazard Rates (Poverty, divorce, hernia recovery)

Readings:

- Stokey and Zeckhauser, "Simulation," Ch. 6, pp. 89-97.
 (Packet 3) Darryll Hendricks, mimeo, "Notes on Computer Simulations"
 (Packet 3) Harold Pollack, mimeo, "Notes on Heterogeneity and Measurement"
 (Packet 3) Bane and Ellwood, "Slipping Into and Out of Poverty: The Dynamics of Spells," *Journal of Human Resources*, Winter 1986, pp. 1-23.
 (Packet 3) Joel E. Cohen, "An uncertainty principle in demography and the unisex issue", *The American Statistician* 40:1 (Feb 1986), pp. 32-39

Fri, Oct 17: Review session (Optional)

Using spreadsheets for simulations and related calculations
 Review of concepts from elementary calculus – conditions for max or min of function of one variable

*****Remember, NO CLASS Mon, Oct 20 – Fall break*****

Wed, Oct 22: Basic Concepts of Optimization

Objective functions and constraints
 First-order conditions for maxima or minima;
 Constraints and Shadow prices, Interpretation
 Linear vs non-linear problems
 Concave vs non-concave optimization problems: meaning, implications
 Continuous vs. discrete problems;

Reading:

- Stokey and Zeckhauser, Chapter 11, "Linear programming"
 (Packet 3) "The Mathematics of Optimization", Ch 2 from W. Nicholson, *Microeconomic Theory*
 (Packet 3) Baumol, "Constrained Maxima: Lagrange Multipliers," Chapter 4, Section 8, in *Economic Theory and Operations Analysis*, pp. 62-67.
 (Packet 3) Mimeo, "Programmed Exercises on Lagrange Multipliers"
 (Packet 3) C. Phillips and R. Zeckhauser, "Restoring Natural Resources with Destination-Driven Costs," *Jrnl of Envt Econ and Mgt* 36, 1998, 225-242. (Optional Reading)

Fri, Oct 24: Review session (Optional)

Further work on calculus, mechanics of optimization

Mon Oct. 27, Wed Oct. 29: Dynamic Optimization

Hotelling rule
Application to natural-resource extraction
Intuitive treatment of Hamiltonian formulation
Dynamic optimization models of climate change

Reading:

- (Packet 3) Solow, "The Economics of Resources or the Resources of Economics," *American Economic Review*, May 1974, pp. 1-14.
- (Packet 3) W.D.Nordhaus, "An Optimal Transition Path for Controlling Greenhouse Gases", *Science* 258: 20 November, 1992, with letters by Schneider, Dowlatabadi and Lave, Oppenheimer, and Nordhaus.
- (Packet 3) "DICE Jr.", with referenced spreadsheet file.
- (Packet 3) Hammel et al, "The continuing U.S. helium saga", *Science*, 2/24/84, with subsequent exchange of letters by Epple and Lave, and Hammel et al
- (Packet 3) "Harvesting Whales"

Fri, Oct 31: Review session (Optional)

4. Strategic Decisions: Game Theory and its Applications: (10 classes)

Mon, Nov 3, Wed, Nov. 5: Basic Concepts of Game Theory

Formulating games: Strategies, payoffs, outcomes
Extensive and Strategic form
Dominance and iterated dominance
Nash equilibrium

Reading:

Dixit and Nalebuff Part 1 (Chapters 1-3 and epilog), pp. 7-86.

Fri, Nov 7: Review session (Optional)

Problem Set 2 (Dynamics and Optimization) Due Fri Nov 7 5:00 PM

Mon, Nov. 10: Mixed Strategies

Definition
Nash equilibrium in mixed strategies
Interpretation and applications (when would you use one?)
Sports; military conflict; terrorism; air marshals.

Reading:

Dixit and Nalebuff, Chapter 7, p. 168-198

Wed, Nov. 12: Coordination and Cooperation Games

PD, Chicken, Assurance

Repeated games

Applications to pollution and resource exploitation, law enforcement, fashion, and technological change

Reading:

Dixit and Nalebuff, Chapter 4, "Resolving the Prisoner's Dilemma", p. 189-118; Chapter 9, "Cooperation and Coordination", p. 222-258.

(Packet 4) T.C. Schelling, *Micromotives and Macrobehavior*. Ch. 3, "Thermostats, Lemons, and other classes of Models"; p., 83-133; Ch. 7, "Hockey Helmets, Daylight Saving, and Other Binary Choices," p. 211-243.

Fri, Nov 14: Review session (Optional)

Mon, Nov. 17, Wed Nov 19: Credibility and Commitments

Sub-game perfection, Threats and Promises

Reading:

Dixit and Nalebuff, Chapters 5 and 6, p. 119-167.

(Packet 4 -- Optional) Blackmon and Zeckhauser, "Fragile Commitments and the Regulatory Process," *Yale Journal on Regulation*, vol. 9, no. 1, Winter 1992, pp. 73-105.

Fri, Nov 21: Review session (Optional)

Mon, Nov. 24, Wed Nov 26: Games with Uncertainty

Formulation: alternative types; rules common knowledge

Signaling and Screening

Applications to diplomacy, terrorism, management, budgeting, and higher education

Reading:

Dixit and Nalebuff, Chapter 12, "Incentives", p. 302-325.

(Packet 4) Akerlof, "The Market for Lemons".

(Packet 4) Spence, "Introduction," "Job Market Signaling," and "Model 2: Education as a Signal," Chapters 1, 2, and 3, in *Market Signaling*, pp. 1-4, 5-13, 14-30

(Packet 4 -- Optional) J. Geanakoplos, "Common Knowledge", *Jrnl of Economic Perspectives* 6:4, Fall 1992, pp. 53-82.

(Packet 4) Pratt and Zeckhauser, "Principals and Agents: An Overview," Chapter 1, in *Principals and Agents*, pp. 1-35.

(Packet 4) Arrow, "The Economics of Agency," Chapter 2, in *Principals and Agents*, pp. 37-51.

Fri, Nov. 28: No Review session – Thanksgiving Break

Mon, Dec. 1: Games Society Plays

Reading:

(Packet 4) Frank, *Choosing the Right Pond*, Chapters 1 and 3 (pp. 3-16, 39-63).

(Packet 4) Frank and Cook, *The Winner-Take-All Society* Chapter 1 (p. 1-22)

(Packet 4) R. Hirschman, *Exit, Voice, and Loyalty*. Chapters 1, 2, 3, and 8 (pp. 1-20, 21-29, 30-43, 106-119).

(Packet 4) Banfield, *The Moral Basis of a Backward Society*, Chapters 1, 2, 5, and 7 (pp. 17-32, 35-42, 83-100, and 123-137).

Wed, Dec. 3: Overflow, additional strategic decision-making applications

Fri, Dec 5: Review session (Optional)

Problem set 3 (Game Theory) Due Friday December 5, 5:00 PM

Mon, Dec 8: Wrap-up: the power of analytic thinking, maxims for professional life