Rational Choice
Carnegie Mellon University
Fall 2008

Instructor:

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We often criticize one another's decisions. People who spend their money at casinos are charged with being ignorant, people who save too much are regarded as miserly, people who chose unpleasant mates are fooling themselves, etc. Sometimes this criticism is failure to recognize diversity – others care about different things than we do – but other times we still regard decisions as wrong even after we know what the decider values. Implicitly judgments like this rely on a notion of "correct" decision making, which will be the topic of our course.

This theory, as it has been developed over many years, is now very detailed and complicated; it involves significant mathematics. The theory is not without its critics either, and we will review a few of those criticisms at the end of the course. Ultimately, learning about this theory will help to tune ones thinking about a variety of problems from gambling to investing to one's romantic life.

Required Texts:	Michael D. Resnik (1987) *Choices: An Introduction to Decision Theory.* University of Minnesota Press Scanned material from David M. Kreps (1988) *Notes on the Theory of Choice*. Westview Press
Course Requirements:	5 Homeworks due throughout the semester – dates to be announced in class* Attendance **and participation in class discussion** can positively influence your grade up to a full letter grade Graduate students will be given extra homework problems and will be required to attend a separate graduate student section.

(*) You are allowed to discuss the homework with one another in attempting to solve the problems, but each individual student must write up the answers independently. If you collaborated with another student in solving a particular problem **you must note who that student is and on which problems you collaborated**. Copying verbatim answers or failing to note collaboration constitutes academic dishonesty.

Reading Schedule

August 26	First day, intro to decision making
August 28	Representations of decisions – normal and extensive form (Resnik 1-1, 1-2, 1-4)
September 1	Preferences as orderings (Resnik 2-1; Kreps pg 7-11)
September 4	Revealed preference theory (Kreps pg 11 – 17)
September 9	Constructing utilities (Kreps pg. 19-26)
September 11	Decision under complete ignorance – dominance strong and weak, etc. (Start reading Resnick 2-2, 2-3, 2-4, 2-5, 2-6)
September 16	Decision under complete ignorance – maximin, etc. (Finish Resnik Ch. 2)
September 18	Naïve probability (Resnik 3-1, 3-2)
September 23	Bayes Theorem and belief revision (Resnik 3-2a)
September 25	Interpretations of probability (Resnik 3-3, 3-3a, 3-3b, 3-3c)
September 30	Dutch book defense of subjective probability (Resnik 3-3c)
October 2	Expected utility of money (Resnik 4-2)
October 7	Problems in interpersonal comparison (Luce and Raiffa, online)
October 9	Von Neumann/Morganstern utility theory (Resnik 4-3; optional detail: Kreps Chapter 5-6)
October 14	Savage Approach: Probability from qualitative likelihood (Kreps pg. 115-117)
October 16	Constructing a probability measure (Kreps pg. 117-119)
October 21	Savage Approach (Kreps 120-125)
October 23	Savage Theory of Choice (Kreps 127-132)
October 28	Savage Theory of Choice day 2
October 30	**No Class**
November 4	Getting probabilities (Kreps 132-136)
November 6	**No Class**
November 11	Conditional Choice (Kreps 138-144)
November 13	Criticisms of decision theory (Resnik 4-4)
November 18	Allais' and Ellsberg's Paradox (Resnik 4-4a, 4-4b)
November 20	St. Petersburg and Newcomb (Resnik 4-4c, 4-5)
November 25	Introduction to social choice and Arrow (Resnik 6-1, 6-2a)
December 2	Arrow's theorem continued (Resnik 6-2b, 6-3)
December 4	Harsanyi's theorem (Resnik 6-4, 6-4a, 6-4b)