In social science, mathematical models of situations in which the behavior or knowledge of other people affects a person’s outcomes are called “games”. Examples include: Bargaining; choosing contracts; trying to coordinate behavior so people are all doing the same thing (synchronizing projects, pulling a rope in tug of war, speaking comprehensible language); constant-sum games in which one person loses if another wins; taking actions which signal special information you have, to induce another person to trust or fear you; and so forth. A large body of game theory characterizes what rational people should do in games, if they are trying to get the best outcome for themselves. An emerging body of research, sometimes called “behavioral game theory”, characterizes how people are likely to actually behave in games. Behavioral game theory mixes elements of standard theory with empirical observation and psychological intuition. A common theme in behavioral game theory is that standard game theory is on the right track but usually does not account for cognitive procedures people are likely to use, and for the nature of social preferences people have towards the outcome of others.

This course is about behavioral game theory. The basic approach is to review bodies of experimental research which have documented regularities in behavior. Psychological concepts are used to interpret results and suggest a next generation of theorizing. Frankly, this course could be taught as a psychology course *or* an economics course, and in the eclectic spirit of Caltech I will teach it as both (although it is listed as Psy 101). As such, it is *not* a traditional course in psychology, and will use psychological ideas only in service of understanding how people behave in games. Students who want a more traditional introduction to psychology should take Psy 20 (cognitive psychology), or CNS 176 (similar to Psy 20) or students who want more focussed discussion should take advanced electives (e.g. other Psy 101 sections). In the first part of the course I will cover some basic game theory (noncooperative games in normal and extensive form, Nash equilibrium and subgame perfection, mixed strategies) which is necessary to make sense of everything that follows (it is a whirlwind tour of what is usually covered in PS/Ec 172. Then we will proceed through classes of games.

Grades will be based on three homeworks (20% each), two reports on specific games that interest you (15% each), and in-class contribution (10%). Contribution means that you have useful things to say in class, or critique arguments of others (including the professor, the reading, or other students) in a constructive and insightful way. The game reports work like so: Choose one game (or more than one if they are closely related) described in my book. Find the original article and read it. Write a short 2-3 page report (12 point font) answering the following questions: Why is this game interesting? What was discovered in the experiment? Did the Camerer book summary leave out something interesting, or perhaps even misreport what was learned? Given the results of the experiment, what kind of experiment should be done next? Depending on class size etc. I might require oral presentations of one of your two reports. All scores in the three categories will be divided by standard deviation and given the weights in parentheses.

All homework and game reports should be done on your own. Do not consult with others while doing the homework, and both A and B are responsible for being sure that if A has
finished the homework but B has not, A's knowledge of it does not influence B. The exams will be closed-book with specific times assigned (probably 6 hours for the entire exam).

The readings for the class my brand new book, Behavioral Game Theory and some handouts in class; extras are always available from Karen Kerbs in Baxter 332 (x4089, kkerbs@hss.caltech.edu).

Syllabus:
weeks 1-2: (3/31, 4/1,7)
Introduction: What this course is about; and Basics of game theory
  noncooperative games, normal and extensive-form, zero-sum games and minimax
dominance-solvability, Nash equilibrium, refinements (perfection, Bayesian-Nash)
selection principles (payoff-dominance, risk-dominance)
read Chapter 1, BGT

Homework #1 due Friday 11 Jan at noon.

week 2-3: (4/9,14,16) Social preferences in dictator, ultimatum and trust games
read chapter 2, BGT

week 4: (4/21,23): Simple bargaining games
  unstructured and sequential bargaining
  structured games, shrinking-pies, cognition
read chapter 4, BGT

week 5: (4/28,30) Coordination games
  matching (focal points), stag hunt, battle-of-the-sexes, culture
read chapter 7, BGT

weeks 6-7 (5/5,7,12): Iterated thinking
  simple dominance-solvable games
  centipede game, e-mail game, p-beauty contests
read chapter 5, BGT; Camerer, Ho, Chong, "A cognitive hierarchy theory of one-shot games",
http://hss.caltech.edu/~camerer/QJE1202a.pdf

week 8 (5/14,19,21): Signaling
read chapter 8 BGT

week 9 (5/28): Learning & teaching
  fictitious play, Cournot, reinforcement, EWA
read chapter 6 BGT
Note: Memorial Day 26 May is an Institute holiday