ECON 322: GAME THEORY

COURSE OUTLINE, 2003

Course Supervisor: Associate Professor Alan Woodfield

Lecturers: Associate Professor Alan Woodfield, Room 511B, Ext. 6884 (364-2884)
E-mail: alan.woodfield@canterbury.ac.nz
Office Hours: Wednesday 9 – 11 am

Professor Vincent Crawford (Erskine Visitor, Term 3), Room 511A, Ext. 6825 (364-6825)
Email: vcrawfor@weber.ucsd.edu
Office Hours: Tuesday 9.30 – 11.30 am

Prerequisites: (1) ECON 204 or 230 or 231, and
(2) MATH 104 or 105 or 106

Restrictions: ECON 301

Lectures and Tutorials: Lecture time, Tuesday 2.10-4.00 p.m. Room C002.
There will also be a one-hour tutorial every week.
Tutorial times to be advised.

Assessment: The weighting of assessment will be:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Problem Sets</td>
<td>10%</td>
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<tr>
<td>Mid-Term Test</td>
<td>40% (Thursday, 21 August, 6.30 – 8.30 pm: 2 hours)</td>
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<tr>
<td>Final Exam</td>
<td>50% (Wednesday, 29th October, pm: 3 hours)</td>
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Textbook:


Copies of these texts are held at the Reserve Desk in the Central Library.
Course material may be found at http://www.econ.canterbury.ac.nz/ungrad.htm
Course Goals and Objectives:
This course examines the issue of how people make decisions when the consequences of their decisions are influenced by the decisions of others. The focus is on noncooperative game theory, which, despite its name, can be used to analyse situations involving either cooperation or conflict, or intermediate situations. Students will be exposed to game theory in action in order to learn how to construct and analyse models of economic, political and social interactions.

Course Contents:
- Introduction to game theory
- Games with simultaneous moves
- Mixed strategies, probability and expected utility
- Coordination in games with multiple equilibria
- Games with sequential moves
- Evolution and learning
- Games with asymmetric (incomplete) information

The theory will be developed along with illustrative applications chosen from the following topics:

- Implicit contracts and supporting cooperation in continuing relationships
- Bargaining
- Strategic moves
- Brinkmanship
- Signalling, screening and cheap talk
- Bidding and Auctions
- Collective action games
- Strategy and Voting

Lecture Outline (Topics 2-9 concern games with symmetric ("complete") information; topics 10-12 concern games with asymmetric ("incomplete") information. Topics 1-7 (approximately) will be covered in the first 6 weeks by Professor Crawford, followed by the midterm; topics 8-13 (approximately) will be covered in the second 6 weeks by Associate Professor Woodfield, followed by the final examination.)

1. Introduction (Dutta, chs. 1-2, [http://weber.ucsd.edu/~vcrawfor/109Slides02.pdf](http://weber.ucsd.edu/~vcrawfor/109Slides02.pdf)):
   - overview of strategic issues and games, symmetric (“complete”) and asymmetric (“incomplete”) information

2. Games with simultaneous moves (Dutta, chs. 3-7):
   a. Dominance, iterated dominance, dominance-solvability, and rationalizability
   b. Pure-strategy Nash equilibrium in games without dominance-solvability
   c. Consistency of equilibrium with rationalizability in dominance-solvable games,
      justification by common knowledge of rationality and of beliefs
3. Probability, expected utility, and Nash equilibrium in mixed strategies (Dutta, chs. 8 and 10):
a. Basic ideas, computation, and existence of mixed-strategy equilibrium in finite matrix games and well-behaved games with continuous strategy spaces
b. Use of mixed strategies for deception in zero-sum games
c. Use of mixed-strategy equilibrium to describe coordination failure, symmetry-breaking and coordination in repeated games

4. Coordination in games with multiple strict equilibria, risk- and payoff-dominance, forward induction and importance of outside options (Dutta, ch. 9):

5. Games with sequential moves (Dutta, chs. 11-13):
a. Extensive form games, strategies (complete contingent plans) versus decisions
b. Rationality, common knowledge of rationality, backward induction and subgame-perfect equilibrium, justification by common knowledge of rationality

6. Commitment, importance of irreversibility and observability, other strategic moves; “cheap talk” announcement of intentions, irrelevance when subgame-perfect equilibrium is unique, possible coordinating role with multiple equilibria (Dutta, chs. 11-13):

7. Evolutionary games and adaptive learning models in games played repeatedly in populations, use of mixed-strategy equilibrium to describe “polymorphic” populations of pure strategies, learning as alternative justification for equilibrium

**Midterm Test**

8. Time discounting, infinite horizons, implicit contracts and the “folk theorem” (Dutta, chs. 14-18):

9. Infinite horizons and subgame-perfect equilibrium (Dutta, chs. 14-18):

10. Games with asymmetric (“incomplete”) information and simultaneous moves (Dutta, chs. 19-21):

11. Games with asymmetric (“incomplete”) information and sequential moves, types, and perfect Bayesian equilibrium (Dutta, chs. 19-21):

12. Auctions, first- and second-price, English and Dutch, revenue-equivalence (Dutta, ch. 23):

13. Signalling games, costly and costless (“cheap talk”) signalling (Dutta, ch. 24):

14.* Adverse selection and monopolistic and competitive screening (Dutta, ch. 24):

15.* Moral hazard, agency and incentive theory (Dutta, ch. 22):

*If time permits

**Final Examination**