Game theory provides a simple, but rich, framework for analysing once-off and repeated interplay between people or firms, where the manner in which each reacts depends upon the other's reaction: strategic interaction. These interactions occur in markets, in organisations, and in the household. This course—through lectures, experiential learning, and computer simulations—will attempt to provide students with understanding of many interactions they may encounter as managers, including price wars, wars of attrition, the value of cooperation interactions, and the value of information.

Outline of course:

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<td>12, 13</td>
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<td>19</td>
<td>Student presentations</td>
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</table>
Recommended texts:


As well, the following books might be found useful:


Bierman H.S. & Fernandez L., *Game Theory with Economic Applications*, Addison-Wesley, 2nd ed., 1998. 330.015193/4 (On reserve) This is highly recommended. It has good sections on games against nature (decision analysis), Nash equilibrium, subgame perfection, and mixed strategies.

Additional readings will be found below. Recommended readings are marked with an asterisk (*). A Package of course notes is available. Readings in the Package are marked with a P.

I have listed the readings for each topic under three headings: A: *Light Background Readings* (can be read before the lecture), B: *Lecture Follow-Ups*, and C: *Deep (more technical) Background Readings*.

**Lecture 1: Introduction and General Principles**

Dixit & Skeath, Chapters 1 and 2, Basic ideas and examples, How to think about strategic games.

McMillan J., Ch3 Understanding cooperation and conflict.

**Light Background Readings—**

* AGSM SGTM students Rod Chisholm and Mike Lindren, Beatiful game theory, *AFR*, P-1
* Wylie I., Mars wins the shipping game, *FastCompany*, P-2
* The Economist, A big pay-off for two theorists, P-3
* Singh S., The greatest game theorist of all, *New Stateman*. P-4

**Deep Background Readings—**


**Lectures 2 to 5: Concepts and Techniques**

**Lecture 2: Simultaneous-Move Games I**

Dixit & Skeath, Chapter 4, Simultaneous-Move Games
Lecture 3: Games with Sequential Moves  
Dixit & Skeath, Chapter 3, Sequential-Move Games

Lecture 4: Simultaneous-Move Games II  
Dixit & Skeath, Chapter 5, Simultaneous Moves with Continuous Strategies

Lecture 5: Combining Sequential and Simultaneous  
Dixit & Skeath, Chapter 6, Combined Games

Light Background Readings—
* Klarreich E., The bidding game, U.S.N.A.S.  P-5  
* Oster C., Can the risk of terrorism be calculated by insurers? Game theory might do it. Wall Street Journal Online, 8 April 2002.  P-7  
* The Economist, Preying on theory, 1999.  P-10  
Smith R., Business as war game: a report from the battlefront, at  
www.business2.com/articles/mag/0,1640,1570,FF.html

Lecture Follow-Ups—
* Garicano, L., Game theory: how to make it pay, Financial Times,  P-11  
* Rothschild R., Ten simple lessons in strategy from the games firms play, Management Today,  P-12  
* Marks R.E., Competition and common property, 1998, at  

Deep Background Readings—

Lectures 6 and 7: Decision Analysis — Games Against Nature  
Dixit & Skeath, Appendix 7: Probability and Expected Utility, pp. 222–231;  

**Light Background Reading**—


**Lecture Follow-Ups**—


Bierman & Fernandez, Ch 10.5–10.7

**Deep Background Reading**—


**Lectures 8 to 13: Broad Classes of Games and Strategies**

**Lecture 8: Mixed Strategies and Unpredictability**

Dixit & Skeath, Chapter 7 and 8

**Lecture Follow-Ups**—

* Dixit & Nalebuff, Ch 7 Unpredictability

Bierman & Fernandez, Ch 10.4

**Lectures 9 and 10: Using Information Strategically**

* Dixit & Skeath, Ch 9 Uncertainty and Information

McMillan, Ch 6 Using information strategically

**Light Background Readings**—

* Gans, Gifts as signals. 2004. P-18


**Deep Background Readings**—

Bierman & Fernandez, Ch 13 Bayesian Nash equilibrium, Ch 15 Perfect Bayesian equilibrium, Ch 18 Adverse selection and credit rationing
Lecture 11: Strategic Moves, Commitment, and Credibility
Dixit & Nalebuff, Ch 5 and 6, Strategic Moves, and Credible commitments.
Dixit & Skeath, Chapter 10, Strategic Moves

Lectures 12 and 13: Solving the Prisoner's Dilemma, and Applications
Dixit & Skeath, Chapter 11, The Prisoner's Dilemma and Repeated Games

Lecture Follow-Ups—
* Dixit & Nalebuff, Ch 4, Resolving the Prisoner's Dilemma

Deep Background Reading—

Lectures 14 to 18: Applications

Lecture 14: Bargaining
Dixit & Skeath, Chapter 17, Bargaining
McMillan, Ch5 Gaining bargaining power

Lecture Follow-Ups—
Dixit & Nalebuff, Ch 11 Bargaining
* Bierman & Fernandez, Ch7 Bargaining.


Deep Background Reading—

Lecture 15: Bidding and Auction Design
Dixit & Skeath, Ch 16, Bidding Strategy and Auction Design
McMillan, Ch11 Bidding in competition
**Light Background Readings**—


* The Economist, Secrets and the prize, 1996.  P-10


* Scientific American, Making honesty pay, January 1997, p.13.  P-25


**Lecture Follow-Ups**—

* Bierman & Fernandez, Ch14 Auctions


**Deep Background Readings**—


* R. Marks, Efficient, competitive, and informed markets: Australian Corporations Law and auctions, 2000, at

Brams S.J. & A.D. Taylor, Fair division by auctions, Ch. 9 in their *Fair Division: From Cake-Cutting to Dispute Resolution*, Cambridge: CUP, 1996.  AGSM 303.69/4

**Lecture 16: Contracting**

* Dixit & Nalebuff, Ch12 Incentives.

McMillan, Ch8 Creating incentives; Ch9 Designing contracts; Ch10 Setting executives' salaries.

**Lecture Follow-Ups**—


* Bierman & Fernandez, Ch12 Moral hazard and involuntary unemployment.

**Deep Background Reading**—


**Lectures 17 and 18: Choosing the Right Game: Co-opetition**


and this Web page:  
[http://mayet.som.yale.edu/coopetition/index2.html](http://mayet.som.yale.edu/coopetition/index2.html)
Light Background Readings—


Deep Background Readings—


And Beyond ... 

For topical readings from the media (ideas for term projects, for instance), on-line games, and other goodies, see:

www.gametheory.net

For a history of game theory (by Paul Walker) since Old Testament times, point your browser at the following URL:

www.econ.canterbury.ac.nz/personal_pages/paul_walker/gt/hist.htm

For further surfing on the 'Net about game theory, start at the following URL:

http://kuznets.fas.harvard.edu/~aroth/airoth.html

And the Game Theory Society at

www.gametheorysociety.org
Assessment

There will be three individual assignments and a short term project (which may be done in groups).

1. The first assignment will be handed out on Wednesday, July 18, and is due on Monday, July 30, by 4 pm. This assignment is worth 15% of the final grade, and must be done individually, although students may talk (but not copy others’ work).

2. The second assignment will be handed out on Wednesday, August 1, and is due on Monday, August 20, by 4 pm. This assignment is worth 15% of the final grade.

3. The third assignment will be handed out on Monday, August 20, and is due on Wednesday, August 29, by 4 pm. This assignment is worth 15% of the final grade.

4. Your project is due by 4 pm on Wednesday, September 19, and is worth 55% of the final grade. It may be done in groups of one, two, or three students. Please hand in a one- or two-page outline of the project topic by Wednesday, August 1, outlining the issue, the players, your data sources, and how you intend analysing it. I expect applications of the framework described in class, not further theory. Groups will present brief outlines of their work on the last week of class.

5. You should start thinking about a project as soon as possible. Please come and talk to me about (a) possible topics of application, and (b) if you want to form a team to do it. You might like to look at some projects from previous years. I'd like decision trees, game trees, and/or payoff matrices. Look for issues with strategic interactions between players, whether simultaneous or sequential. (But avoid movies especially with (1) extensive chases, (2) more than one person shot dead with revolver or pistol.)

Previous projects available from Bob for perusal:
(M/N = movie or novel, S = sport, W = war, B = business, P = politics)

<table>
<thead>
<tr>
<th>Author</th>
<th>Title of Project</th>
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</table>
| Blumberg     | The ARL versus Super League Rugby  
B/S: Was the tussle a PD? Could much anguish and money have been saved? Analysing the battle for control of rugby league. |
| Boyd         | Rupert Murdoch, Game Player  
B/P: Rupert conquers the world from Adelaide, doh. |
| Bugg         | The natural-gas-pipeline game  
B: BHP v. AGL for NSW–Victoria interconnection. |
| Carlin       | Home loan wars  
B: Two types of player in the highly rivalrous oligopoly of mortgage lending in 1996 NSW. |
| Chan         | Bargaining in the H.K. property market  
B: Behaviour, from a seller's perspective, on the roiling Hong Kong property market. |
| Cheung       | The Hong Kong IDD price war  
B: CTI v. HKT and the resulting price war for phone calls. |
| Chisholm     | Telstra versus the Government. |
B/P: In the lead up to T3, Sol y son amigos threaten the Government with a low Telstra price or freedom from the ACCC.

Collins ................. Australian discount variety sector price wars.
B: The $2 stores fight it out.

Coristine ................ Canadian beer wars
B: Molson and Labatt ignore the micros, sell out, and then descend to a price war, eh?

Davis .................... The shifting sands: OPEC
B: A game-theory analysis of the development, formation, and demise of OPEC.

Dehne ................... Co-opetition in the Supply Chain software market.
B: SAP vies with i2 and others: what is the right game?

El-Rakshy ............... Granada v. Forte
B: the ins and outs of a hostile takeover.

Falendysz .............. NASDAQ v. the LSE
B: An analysis of a takeover attempt.

Field ..................... Video-game console wars

Germanos ............... A subsidy war between Regional Aircraft manufacturers
B/P: Canada’s Aerospace-Bombardier v. Brazil’s Embraer.

Guo ....................... The 3G auction in the UK
B: Expensive lessons for the winner

Hicks .................... The World Series Cricket Revolution
B/S: Kerry Packer v. the Australian Cricket Board.

Hui ....................... QANTAS in the post-deregulation world
B: and Compass, Virgin, Ansett, SIA, ANZ.

Karanjia .................. The war of the browsers
B: Microsoft v. the US Justice Dept., with focus on the battle between Netscape and Explorer. Uses a Coopetition perspective.

Kelly ..................... Shopping for Safeway (UK)— 4 supermarkets & a regulator
B: Five bidders vie for Safeway UK in 2003. Who will win?

Koo ....................... The battle for AFL first and last rights
B/S: Sport is big business. The bidding battle for AFL TV rights among Network Seven, The Nine Network, the AFL, and the rest of us.

Leong .................... KKR, the company
B: the leveraged buyout LBO battles.

Li ....................... The TV price war in China
B: the evolving technology and market among the nine (three major) TV manufacturers in China.

Lin ....................... Tamasek Holdings v. Wee Cho Yaw
B: Unlocking the value of Singapore’s United Overseas Land.

Low ....................... R.J.R. Nabisco: the world’s richest auction
B: Barbarians at the Gate helps answer two questions:
• can game theory explain the protagonists’ action in the L.B.O.?
• would a game theorist have acted differently?

Lui ....................... Cathay Pacific v. its pilots’ union
B: both sides learn from three successive industrial disputes between management and the pilots.

McDonald .............. S.E. Asian Telecoms battle for growth 1999–2000
B: SingTel, PCCW, Telstra, and Optus.

Pandey ................... Winning the Sydney 2000 Olympics
B/S: “The Bid” — Australia’s strategy in winning the Olympics.
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<th>Author</th>
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<td>Rivalry in China’s petroleum duopoly</td>
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<td>A comparison of the evolution of two markets for mobiles.</td>
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<td>Selling cinematic rights for independently produced motion pictures on the Riviera analysed.</td>
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<td>An analysis of the strategic interactions of the winning campaign of Australia II.</td>
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<td>Basnayake</td>
<td>The Hunt for Red October, the movie</td>
<td>Game theory applications in naval warfare.</td>
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<td>House of Games, the movie</td>
<td>David Mamet’s classic movie of games within games and deception within deception.</td>
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<td>Chaney</td>
<td>Survivor: a game theory analysis</td>
<td>TV: how to win at Survivor; how to keep your audience coming for more.</td>
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<td>Flynn</td>
<td>Wall Street, the movie</td>
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<td>Sexual harassment — a strategic weapon in the game of office politics?</td>
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<td>French</td>
<td>Playing Diplomacy and its appeal</td>
<td>Game: A board game with much greater freedom: to diplomate, to threaten, to promise, to ally, to stab, to die, to conquer — how and why?</td>
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<td>Koestoer</td>
<td>The Good, the Bad, and the Ugly, the movie</td>
<td>The classic road movie, many 2- and 3-person interactions.</td>
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<td>Sayers</td>
<td>The Bonfire of the Vanities</td>
<td>Master of the Universe or Master of the Game. McCoy falls.</td>
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<tr>
<td></td>
<td></td>
<td>Analysis of three interactions in the novel.</td>
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<tr>
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<td>Smith</td>
<td><em>Conrad's Nostromo</em>, the novel</td>
<td>M/N: By modelling three games embedded in the novel's storyline, shows how game theory can help in the analysis of the plot.</td>
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<td>W: Trying to unravel the misunderstandings and motives and strategies of the two sides which resulted in war and death.</td>
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<td>Fahey</td>
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<tr>
<td>Fahy</td>
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<td>W: David v. Goliath: Croatia's political and military strategies during the fall of Yugoslavia.</td>
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<td>W: Bushido against Western rationalism. Misunderstandings and war.</td>
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<td>W: Was the war inevitable? Why did the negotiations to end it fail? Analysis of the Japanese and US diplomatic and military strategies.</td>
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<td>P: Gus Durr's fall in Jakarta.</td>
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<td>P: Analyses the interactions of the candidates for Mayor of Leichhardt. The movie records the words, actions, and musings as they happened.</td>
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<td>Joullié</td>
<td>Signals of war before the Falklands conflict</td>
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<tr>
<td>Killeen</td>
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<td>P: Sinn Féin, the IRA, the Ulstermen, Catholics, and the British government.</td>
</tr>
<tr>
<td>Krishnakumar</td>
<td>Iran v. the IAEA</td>
<td>P: Iran games the West over its nuclear program</td>
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<tr>
<td>Richard</td>
<td>The (eastern) enlargement of the E.U.</td>
<td>P: the countries playing, their payoffs, and their strategies to do better.</td>
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<tr>
<td>Salvador</td>
<td>The Marcos ouster</td>
<td>P: In 75 hours a small group of soldiers toppled the President. Credible commitments and asymmetric information in the coup.</td>
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<td>Shah</td>
<td>Machiavelli's <em>The Prince</em>, Composite Principalities</td>
<td>P: How to hold a conquered country. (Listen up, George.)</td>
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<td>Tziolis</td>
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<td>P: Lies, refugees, and the 2001 election.</td>
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P: Malaysia v. Australia: A three-week spat analysed.

Wong ................. Taiwan’s 2000 Presidential Election
P: From Taipei mayor to beating the KMT candidate.

Germes ................. Designing “interesting games”
Theory: Dixit & Nalebuff’s strategic-voting example corrected.

Email Bob for copies of any of these.