

Why Game Theory is Important to Universities

By
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Game theory is essentially the mathematics of conflicts. Within Australian universities it is usually taught within Microeconomics. However, it is also taught within Negotiation, Business, Law, Mathematics, Statistics, Security, Psychology, Computing, Management and Industrial Organization. Despite game theory being highly mathematical it is rarely taught within mathematics in Australian universities. As of 2019 it appears that only RMIT and the University of Southern Queensland offer game theory within mathematics. Operations Research is a method of mathematically based analysis for providing a quantitative basis for management decisions. Game theory is part of operations research. The author did two subjects in operations research at Macquarie University in an undergraduate degree majoring in mathematics and graduating in 1999. These two operations research subjects are classified under statistics and are still offered as of 2019. One of these subjects in operations research offers game theory; in particular the third-year subject (where the second-year subject is a prerequisite to the third-year subject). The author did a Graduate Diploma in Operations Research (GradDipOR) at the University of Technology Sydney and graduated in 2002. Game theory was not part of this degree. As of 2019 it appears that this GradDipOR is not offered anymore. Operations Research as of 2019 is offered as a major as an undergraduate degree but doesn't contain game theory. Further, game theory is offered in two subjects as of 2019 but it appears to be classified under microeconomics.

Table 1 represents all universities in Australia ordered by rank in 2019 (although it appears as 2020) and whether they offer courses that include game theory. The QS ranking system was used

<https://www.universityrankings.com.au/qs-australian-rankings.html>

Note also that Carnegie Mellon University and The University of Notre Dame offer courses in game theory as of 2019 but are not listed in the QS ranking system. What is interesting from table 1 is that the rankings of the universities that don't offer game theory are towards the bottom and the universities that do offer game theory are ranked towards the top within Australia. What is also interesting is that it appears that the University of Wollongong which is ranked 11th in Australia used to have a subject in Microeconomic Theory and Policy that included game theory back in 2016. There have been many Nobel Prizes in Economics based on game theory. For example, John Nash in 1994, Robert Aumann in 2005, Roger Myerson in 2007 and Lloyd Shapley in 2012. These Nobel Prize winners are essentially mathematicians (rather than economists). In particular John Nash (as depicted in the movie 'A Beautiful Mind') is arguably one of the best mathematicians of all time. The above implies two things. Firstly, that game theory should be included within mathematics degrees within universities and secondly government or private funding for universities (at least within Australia) should be correlated with their rankings. This latter implication would then introduce subjects that include game theory into Australian universities that don't currently offer game theory.

Aus Rank	University	QS Rank 2020	Game Theory courses
1	Australian National University	29	Yes
2	University of Melbourne	38	Yes
3	University of Sydney	42	Yes
4	University of New South Wales	43	Yes
5	University of Queensland	47	Yes
6	Monash University	58	Yes
7	University of Western Australia	86	Yes
8	University of Adelaide	106	Yes
9	University of Technology Sydney	140	Yes
10	University of Newcastle	207	Yes
11	University of Wollongong	212	
12	Queensland University of Technology	224	Yes
13	Curtin University	230	Yes
14	Macquarie University	237	Yes
15	RMIT University	238	Yes
16	Deakin University	271	Yes
17	University of South Australia	274	Yes
18	University of Tasmania	291	Yes
19	Griffith University	320	
20	James Cook University	377	
21	Swinburne University of Technology	383	
22	La Trobe University	400	Yes
23	Flinders University	424	
24	Bond University	442	Yes
25	Western Sydney University	468	
26	University of Canberra	484	
27	Murdoch University	571-580	
=28	CQUniversity	601-650	
=28	Victoria University	601-650	
=30	Charles Darwin University	651-700	
=30	Edith Cowan University	651-700	
=32	Southern Cross University	751-800	
=32	University of Southern Queensland	751-800	Yes
=34	Australian Catholic University	801-1000	
=34	University of New England	801-1000	
-	Charles Sturt University	-	
-	University of the Sunshine Coast	-	

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