School of Economics

Academic Year 2025-26
Term 2

ECON106Z: H3 Game Theory
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COURSE DESCRIPTION

This course provides an introduction to *Game Theory*. Game theory deals with decisions of conflict and cooperation between equally intelligent individuals. In such a context each party needs to take into account the decision that the other will take, before choosing the best plan of action.

Models are used to describe the structure of the decision problem and enable the analysis of the possible scenarios. The descriptions are often expressed through graphs and mathematical language, and the scenarios are analysed with rigorous logical thinking.

In this course, particular attention will be given to situations that are essentially economic in nature but there will also be examples where social or political goals and factors are primary.

Reference to real world examples will be made extensively throughout the course. Likely applications are: how to look at the pricing problem in oligopolies; how to distinguish between competition and collusion in markets; where do politicians stand on issues during electoral campaign; how norms of cooperation may emerge in societies.

The syllabus is designed under the assumption that students have a knowledge and understanding of Economics at the H2 level, are willing to being pushed to a higher level of intellectual challenge and are capable of self-directed and independent (but supervised) learning.

LEARNING OBJECTIVES

By the end of the semester, students will have mastered the foundations of Game Theory and will have learned to apply the game-theoretic framework to analysing market competition and resource allocation problems that are directly related to the H2 Economics syllabus.

Students will also be equipped with a better appreciation of the strategic interactions present in different types of economic activity and social interactions.

Students will also get a glimpse of their future life in university in general, and SMU in particular.

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ASSESSMENT METHODS

Class Participation **:** **5%**
Mid-term Test **:** **25%**
Final Examination **:** **70%**
Total **:** **100%**

Participation is graded on the basis of different variables that depend on the engagement in class activities. More details on how these variables are aggregated will be provided in class.

Midterm exam: the midterm exam lasts for 2.5 hours. It is made of 3 structured problems questions that have subparts. All questions are compulsory. The regularly assigned homework provides an idea of the type of questions asked in the final exam, although students should not expect to be tested on the exact same questions from the homework. <u>The midterm exam is individual, closed book, no calculator</u>.

Final Exam: The final exam lasts for 3 hours. It is made of 4 structured problem questions that have subparts. All questions are compulsory. The regularly assigned homework provides an idea of the type of questions asked in the final exam, although students should not expect to be tested on the exact same questions from the homework. <u>The final exam is individual, closed book, no calculator</u>.

ACADEMIC INTEGRITY
All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences.
All work (whether oral or written) submitted for purposes of assessment must be the student's own work. Penalties for violation of the policy range from zero marks for the component assessment to expulsion, depending on the nature of the offense.
When in doubt, students should consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at <u>http://www.smuscd.org/resources.html</u>.

ACCESSIBILITY

SMU strives to make learning experiences accessible for all. If students anticipate or experience physical or academic barriers due to disability, please let the instructor know immediately. Students are also welcome to contact the university's disability services team if they have questions or concerns about academic provisions: <u>included@smu.edu.sg</u>.

Please be aware that the accessible tables in the seminar room should remain available for students who require them.

CLASS TIMINGS AND EXPECTATIONS

The class meets once a week for a three-hour session. Each session consists of a detailed explanation of the models discussed throughout the course and their applications. Time will also be devoted to *play some games* and to go through crucial steps of the homework assignments.

Students are expected to be motivated and focused, capable to work independently but also to contribute to the classroom environment. Students should not expect to be spoon fed.

The emphasis in this course is on the learning process and not on the memorization of few formulas. Therefore, curious and inquisitive minds will find this course intellectually stimulating and rewarding.

RECOMMENDED TEXT AND READINGS

The course is designed to be self-contained. The lectures follow quite closely the following textbook which is therefore the main references for students.

Dixit, Skeath and Reily; *Games of Strategy,* International Student Edition, 5th ed. W. W. Norton, New York, London.

WEEKLY LESSON PLAN

Week		Topics
1	Week 1	**Strategic Thinking with game theory** • **What is a game of strategy?** • **Rules of the Game** • **Decisions versus tactics**
2	Week 2	**Game with sequential moves** • **Drawing game trees** • **Backward Induction** • **Rollback equilibrium**
3	Week 3	**Games with simultaneous moves** • **Nash equilibrium** • **Continuous variables**
4	Week 4	**Games of dynamic competition** • **Combining sequential and simultaneous moves** • **Applications to business and politics**
5	Week 5	**Simultaneous-move games with mixed strategies** • **Beliefs and Responses** • **Games with more than two strategies**
6	Week 6	**The Prisoners' Dilemma** • **Repeated interactions** • **Applications to Politics, Evolutionary Biology**
7	Week 7	**Revision and Midterm exam (2.5 hours)**
8	Week 8	**Uncertainty and Information** • **Strategies to manipulate information** • **Screening versus signaling**
9	Week 9	**Entry Deterrence under Asymmetric Information** • **Separating, Pooling and Semi-separating Equilibrium**
10	Week 10	**Games with strategic moves** • **Commitment, threats and promises:** • **Applications: US-Japan trade relations**
11	Week 11	**Introduction to Auction Theory** • **Private-values auction model** • **Common-values auction model**
12	Week 12	**Revision and Class Exercises**
13	Week 13	**Final Exam: 3 hours**

CALENDAR OF CLASSES

Week	Groups			Comments
	G1 (4.30pm-7.30pm)	G2 (9.00am-12.00pm)	G3 (2.00pm-5.00pm)	
1	Friday, 9 January 2026	Saturday, 10 January 2026	Saturday, 10 January 2026	
2	Friday, 16 January 2026	Saturday, 17 January 2026	Saturday, 17 January 2026	
3	Friday, 23 January 2026	Saturday, 24 January 2026	Saturday, 24 January 2026	
4	Friday, 30 January 2026	Saturday, 31 January 2026	Saturday, 31 January 2026	
5	Friday, 6 February 2026	Saturday, 7 February 2026	Saturday, 7 February 2026	
6	Friday, 20 February 2026	Saturday, 21 February 2026	Saturday, 21 February 2026	
7	Saturday, 28 February 2026	Saturday, 28 February 2026	Saturday, 28 February 2026	Midterm exam at 9am.
8	Friday, 6 March 2026	Saturday, 7 March 2026	Saturday, 7 March 2026	
9	Friday, 13 March 2026	Saturday, 14 March 2026	Saturday, 14 March 2026	
10	Friday, 27 March 2026	Saturday, 28 March 2026	Saturday, 28 March 2026	
11	Friday, 10 April 2026	Saturday, 11 April 2026	Saturday, 11 April 2026	
12	Friday, 17 April 2026	Saturday, 18 April 2026	Saturday, 18 April 2026	
13	Saturday, 2 May 2026	Saturday, 2 May 2026	Saturday, 2 May 2026	Final exam at 9am.