

GAME THEORY AND ECONOMIC SHOCKS

Course code	<i>GRAE036</i>
Course title	<i>Game Theory and Economic Shocks</i>
Type of course	<i>Compulsory</i>
Level of course	<i>Graduate</i>
Year of study	<i>2nd</i>
Number of credits	<i>6 ECTS (36 contact hours + 2 consultation hours, 124 individual work hours)</i>
Lecturer	<i>Assoc. Prof. Dr. Pijus Krūminas</i>
Prerequisites	<i>none</i>
Teaching language	<i>English</i>

THE AIM OF THE COURSE

The course aims to provide students an understanding of the concepts of game theory and its application in the context of economics, especially, when analysing the effects of external factors on the economic systems. Students will acquire skills needed to address fundamental issues as well as to solve practical challenges in economics through a combination of lectures, seminars and hands-on use of game theory in their project work. The work will focus on first laying and understanding the foundations on game theory and then looking at specific studies to understand how game theory is applied by researchers and how it can be used in practice. The course also introduces students to related modelling approaches, such as agent-based modelling and wargaming.

MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex), ASSESMENT AND TEACHING METHODS

Course level learning outcomes (objectives)	Degree level learning objectives (Number of LO)	Assessment methods	Teaching methods
CLO1. Students will learn to understand game theory research in the field of economics, how game theory can help to better understand economic processes, including reaction to shocks.	LO3.1	Written project, final exam	Lectures, seminars
CLO2. Students will learn to apply game theory tools for addressing economic issues whether theoretical or practical through a combination of small problems discussed in class and their own work.	LO3.1, LO4.1	Written project, final exam	Lectures, seminars, project development
CLO3. Students will develop a game theory model to describe an economic shock, applying the skills needed to simplify and abstract social reality, strengthening their modelling skills.	LO3.1, LO4.1	Written projects	Lectures, seminars, project development
CLO4. Students will learn to prepare a research paper based on the application of game theory tools. The research paper will have to address an economic problem selected by students, thus, making it closer to the practical problems that students may face, including outside academia.	LO3.1, LO4.1, LO6.2	Written project	Lectures, seminars, project development

ACADEMIC HONESTY AND INTEGRITY

The ISM University of Management and Economics Code of Ethics, including cheating and plagiarism are fully applicable and will be strictly enforced in the course. Academic dishonesty, and cheating can and will lead to a report to the ISM Committee of Ethics. With regard to remote learning, ISM reminds students that they are expected to adhere and maintain

the same academic honesty and integrity that they would in a classroom setting.

AI USE POLICY

Students are encouraged not to use AI tools in this course. Instead, they are encouraged to use their own creativity and curiosity in coming up with topics and researching them. However, if need be, students are allowed to use AI for brainstorming process and as a tool to search for information. It is not allowed to use AI tools to generate actual content of course deliverables. Any use of AI must be disclosed.

Course Content

DATES	TOPIC	IN-CLASS HOURS	SUGGESTED READINGS
2026 09 04	Introduction to the course Models and reality Introduction to game theory Extensive form games and backwards induction Strategic form games	4	Bonnano (2015) Gibbons (1997) Gintis (2007)
2026 09 09	Applications of game theory Player perspectives Discussion on game theory assumptions and applicability based on selected examples	4	Sethi (2018) Samuelson (2016) Leeson (2007)
2026 09 10	'Classical' games: Prisoners' Dilemma, auctions, etc. Main concepts: Nash Equilibrium, strategies, mixed strategies, etc. Workshop on solving different games	4	Bonnano (2015) Mengel (2017)
2026 09 11	Technological change Response to technology and technology adoption from the game theoretic perspective Project sounding board	4	Allen & Leeson (2015) Baniak & Dubina (2012) Zhu & Weyant (2003)
2026 09 14	Political factors Exit, Voice, and Loyalty Game Implications for economic agents Workshop on game theory in politics	4	Clark, Golder & Golder (2013) Weingast (1997)
2026 09 18	Policy and game theory Policy analysis from game theoretic perspective Monetary and fiscal policy Discussion on policy and interests	4	Hermans, Cunningham & Slinger (2014) Nordhaus (1994)
2026 09 21	Crisis and responses Evolutionary games to understand behaviour under crisis conditions Project sounding board	4	Hanauske et al. (2010) Alam, Kabir & Tanimoto (2020)
2026 09 23	Learning from history Applications of economic history Using the past to inform research	4	Blum & Colvin (2018)
2026 09 24	Wargaming as a research and modelling method Wargaming, game theoretic situations and economic shocks	4	None
		Total: 36 hours	
	CONSULTATIONS	2	
	FINAL EXAM / PROJECT	2	

FINAL GRADE COMPOSITION

Type of assignment	%
Group Components 60%	
Written project	60

Individual Components 40%	
Final exam	40
Total:	100

DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT

(Provide short descriptions and grading criteria of each assignment)

Students will work in small groups of 3-4 to develop a project, where they apply game theoretic tools to study an economic problem of their choice. However, while this is a group project, grades within the group may vary based on their contributions based on group's identification of individual contributions to ensure that all students have contributed to the project and their contribution can be clearly identified. The project will be evaluated based on the analysis of the topic chosen and the application of game theory to study the selected problem. The other part of the final grade will consist of the final exam (40%), which will have a selection of multiple choice and open questions, testing students' knowledge on the game theory concepts and requiring their application to the small tasks given as open questions.

RETAKE POLICY

Retake covers the final exam (40%) part. The retake will have the same structure as the final exam. Written project result cannot be retaken, but its evaluation (if positive) is not annulled. Therefore, to pass the course, a positive grade from the project is necessary.

REQUIRED READINGS

Alam, M., Kabir, K. A., & Tanimoto, J. (2020). Based on mathematical epidemiology and evolutionary game theory, which is more effective: quarantine or isolation policy? *Journal of Statistical Mechanics: Theory and Experiment*, 2020(3), 033502.

Baniak, A., & Dubina, I. (2011). Innovation analysis and game theory: A review. *Innovation: Management Policy and Practice*, 14(2), 178-191.

Bonnano, G. (2015). *Game Theory: An open access textbook with 165 solved exercises*. Published by Giacomo Bonnano, University of California, Davis.

Clark, W.R., Golder, M. & Golder, S.N. (2013). *Power and Politics: Insights from an Exit, Voice, and Loyalty Game*.

Gibbons, R. (1997). An Introduction to Applicable Game Theory. *Journal of Economic Perspectives*, 11(1), p. 127-149.

Hermans, L., Cunningham, S., & Slinger, J. (2014). The usefulness of game theory as a method for policy evaluation. *Evaluation*, 20(1), 10-25.

Samuelson, L. (2016). Game Theory in Economics and Beyond. *Journal of Economic Perspectives*, 30(4), p. 107-130.

Weingast, B. R. (1997). The political foundations of democracy and the rule of law. *American political science review*, 245-263.

Additional readings

Allen, D.W., & Leeson, P.T. (2015). Institutionally constrained technology adoption: Resolving the longbow puzzle. *The Journal of Law and Economics*, 58(3), 683-715.

Blum, M., & Colvin, C. L. (Eds.). (2018). *An Economist's Guide to Economic History*. Palgrave Macmillan.

Carfi, D., & Musolino, F. (2013). Game theory application of Monti's proposal for European government bonds stabilization. *Applied Sciences*, 15.

Gintis, H. (2007). A framework for the unification of the behavioral science. *Behavioral and Brain Sciences*, 30, p. 1-61.

Hanauske, M., Kunz, J., Bernius, S., & König, W. (2010). Doves and hawks in economics revisited: An evolutionary quantum game theory based analysis of financial crises. *Physica A: Statistical Mechanics and its Applications*, 389(21), 5084-5102.

Leeson, P.T. (2010). Pirational Choice: The Economics of Infamous Pirate Practices. *Journal of Economic Behaviour & Organisation*, 76(3), p. 497-510.

Mengel, F. (2017). Risk and Temptation: A Meta-Study on Prisoner's Dilemma Games. *The Economic Journal*, 128, p. 3182-3209.

Nordhaus, W. D., Schultze, C. L., & Fischer, S. (1994). Policy games: Coordination and independence in monetary and fiscal policies. *Brookings Papers on Economic Activity*, 1994(2), 139-216.

Sethi, R. (2018). Rationalizing Choice: A Review Essay on Peter Leeson's WTF?!: An Economic Tour of the Weird. *Journal of Economic Literature*, 57, p. 988-1000.

Zhu, K., & Weyant, J. P. (2003). Strategic decisions of new technology adoption under asymmetric information: a game-theoretic model. *Decision sciences*, 34(4), 643-675.

ADDITIONAL READINGS

None

ANNEX

DEGREE LEVEL LEARNING OBJECTIVES

Competency goals and learning objectives for the Master of Social Science

Programmes:

Financial Economics

Competency Goal	Learning Objective
Students will demonstrate advanced disciplinary knowledge.	LO1.1. Students will demonstrate advanced discipline knowledge through the independent development of a Master's thesis, showing a deep understanding and appropriate application of theories, concepts, and methods relevant to their field of study.
Students will be digitally competent.	LO2.1. Students will demonstrate digital agility competencies by selecting and applying appropriate tools, platforms or technologies, integrating digital insights into business decision-making, and adapting digital approaches in response to evolving project requirements and contextual changes.
Students will be critical thinkers	LO3.1. Students will be able to identify underlying assumptions, limitations of previous research; evaluate managerial solution alternatives.
Students will be independent learners	LO4.1. Students will become independent learners and develop their own comprehension of scientific theories, models, and concepts
Students will be socially responsible leaders	LO5.1. Students will be able to evaluate past and current practices in their discipline from an ethical perspective .
Students will be effective communicators	LO6.1. Students will develop and deliver a coherent oral presentation
	LO6.2. Students will develop and deliver a coherent written research paper