Game theory for Economics and Politics

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| Course code | *POL144* |
| Compulsory in the programmes |  |
| Level of studies | *Undergraduate* |
| Number of credits | *6 ECTS (48 in-class hours + 6 consultation hours + 2 exam hours, 104 individual work hours)* |
| Course coordinator (title and name) | *Dr. Simonas Cepenas* |
| Prerequisites | *None* |
| Language of instruction | *English* |

**THE AIM OF THE COURSE:**

The course aims to (1) familiarize students with key concepts of game theory, (2) study strategic interactions at individual, firm, societal, state, and international levels, (3) teach students about different definitions and models of rationality, and (4) provide students with tools to read and understand literature that uses rational choice framework. By the end of the course students will be able to analyze real world problems using game theoretic tools.

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

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| Course level learning outcomes (objectives) | Learning objectives for BSc in Business Management | Assessment methods | Teaching methods |
| CLO1. Introduce students to rational choice framework. List assumptions and predictions rational choice models make. | ELO1.1., ELO1.2. | Midterm, final exam, problem sets | Lecture, Seminars |
| CLO2. Learn how to model interactions between individuals, firms, bureaucracies, and nation states. | ELO1.1., ELO1.2. | Midterm, final exam, problem sets | Lecture, Seminars |
| CLO3. Learn about different game theoretic models: static games of complete information, static games of incomplete information, dynamic games of complete information, and dynamic games of incomplete information. | ELO1.1. | Midterm, final exam, problem sets | Lecture, Seminars |
| CLO4. Gain familiarity with key concepts of game theory: complete information, incomplete information, normal form, dynamic form, bargaining, principal-agent relation, mechanism design, adverse selection, moral hazard, conditional probabilities. | ELO1.1., ELO1.2. | Midterm, final exam, problem sets | Lecture, Seminars |
| CLO5. Learn about different solution techniques: backwards induction, IESDS, Nash Equilibria, Mixed Strategy Nash Equilibria, Subgame Perfect Nash Equilibria, Bayesian Nash Equilibria, Perfect Bayesian Equilibria, and Maximin-Minimax Method. | ELO1.1., ELO1.2., ELO2.1. | Midterm, final exam, problem sets | Lecture, Seminars |
| CLO6. Hone your skills for working in groups and individually, while facing time constraints. | ELO4.1. | Problem sets | Individual and group work outside lectures and seminars, office hours |
| CLO7. Acquire critical thinking, logical reasoning, and problem-solving skills. | ELO4.1. | Problem sets, midterm, final exam | Seminars |

**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.

**COURSE OUTLINE**

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| **Topic** | **In-class hours** | **Readings** |
| Introduction to rational choice | 4 | Kydd, p. 1-10 |
| Introduction to static games of complete information: Normal form games and pure-strategy Nash Equilibria | 4 | Gibbons, ch. 1 |
| Normal-form games with three players | 4 | TBA |
| Applied Microeconomics: Cournot duopoly competition | 4 | Gibbons, p. 14-26 |
| Lotteries and mixed strategies | 4 | Gibbons, p. 29-33, Tadelis, ch. 6 |
| Median voter’s theorem | 4 | Anthony Down’s on [MVT](https://www.jstor.org/stable/1827369?seq=1) |
| Midterm | 4 |  |
| Introduction to dynamic games of complete information: Extensive-form games (Backwards Induction, Subgame Perfect Nash Equilibria, Expected Utility) | 4 | Gibbons, ch. 2 |
| Repeated games | 4 | Axelrod and Hamilton on [Evolution of Cooperation](http://www-personal.umich.edu/~axe/research/Axelrod%20and%20Hamilton%20EC%201981.pdf), Gibbons, p. 88-94 |
| Bargaining games | 4 | Fearon on Rationalist explanations of war |
| Introduction to static games of incomplete information | 4 | Gibbons ch.3, George Akerlof on [the market of lemons](https://www.jstor.org/stable/1879431?seq=1) |
| Introduction to dynamic games of incomplete information | 4 | Gibbons ch.4 |
|  | **Total: 48 hours** |  |
| CONSULTATIONS | 6 |  |
| FINAL EXAM | 2 |  |

**FINAL GRADE COMPOSITION**

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| **Type of assignment** | **%** |
| *Group Components (10%)* |  |
| Seminar participation and attendance | 10% |
| *Individual Components (90%)* |  |
| Problem sets | 20% |
| Midterm examination II | 30% |
| Final examination | 40% |
| **Total:** | **100** |

**DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT**

*(Provide short descriptions and grading criteria of each assignment)*

Problem sets will consist of open-answer modeling questions. These will be homework assignments, but students will be allowed to work on problem sets together. It will make up 20% of the grade.

The midterm exam will consist of multiple-choice and open-answer modeling questions. It will take place during the lecture and it will comprise 30% of the final grade. The midterm will be based on topics 1-6.

Final exam will consist of multiple choice, open-answer modeling questions. It will take place during the lecture and will comprise 40% of the final grade. The midterm will be based on topics 8-12.

Seminar discussions will address all topics covered in class. These activities will take place during the lecture and together with attendance will comprise 10% of the final grade.

**RETAKE POLICY**

*(Provide short description and percentage of the final grade)*

In case of a negative final grade, students can sit for a retake exam. Such an exam will cover all course material. The weight of a retake is 70%. Seminar participation grade and problem sets are not subject to retake but their evaluation (if positive) will count towards the final grade with the retake exam.

**ADDITIONAL REMARKS**

The syllabus is subject to small changes. Specific chapters from the books are TBA. All readings other than the Gibbons book will be available online on the course website.

Math can feel hard sometimes – do NOT be afraid or embarrassed to ask for help. Use office hours and feel free to ask questions in class. If you do NOT understand something, clarify immediately. A small question now will likely turn into more confusion later.

**REQUIRED READINGS**

Robert Gibbons, Game Theory for Applied Economists.

George A. Akerlof. (1970). “The Market for ‘Lemons’: Quality Uncertainty and the Market Mechanism.” The Quarterly Journal of Economics, vol. 84, no. 3, pp. 488–500, <https://doi.org/10.2307/1879431> .

Anthony Downs. (1957). “An Economic Theory of Political Action in a Democracy.” *Journal of Political Economy*, vol. 65, no. 2, , pp. 135–50, <http://www.jstor.org/stable/1827369> .

Robert Axelrod and William D. Hamilton. (1981).  “The Evolution of Cooperation”. Science, Vol 211, Issue 4489, pp. 1390-1396, DOI: 10.1126/science .

**ADDITIONAL READINGS**

Andrew H. Kydd, International Relations Theory The Game Theoretic Approach.

Steven Tadelis, Game Theory: An Introduction.

**ANNEX**

**DEGREE LEVEL LEARNING OBJECTIVES**

**Learning objectives for the Bachelor of Business Management**

*Programmes:*

*International Business and Communication,*

*Business Management and Marketing, Finance,*

*Industrial Technology Management*

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| **Learning Goals** | **Learning Objectives** |
| Students will be critical thinkers | BLO1.1. Students will be able to understand core concepts and methods in the business disciplines |
| BLO1.2. Students will be able to conduct a contextual analysis to identify a problem associated with their discipline, to generate managerial options and propose viable solutions |
| Students will be socially responsible in their related discipline | BLO2.1. Students will be knowledgeable about ethics and social responsibility |
| Students will be technology agile | BLO3.1. Students will demonstrate proficiency in common business software packages |
| BLO3.2. Students will be able to make decisions using appropriate IT tools |
| Students will be effective communicators | BLO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations |
| BLO4.2. Students will be able to convey their ideas effectively through an oral presentation |
| BLO4.3. Students will be able to convey their ideas effectively in a written paper |

**Learning objectives for the Bachelor of Social Science**

*Programmes:*

*Economics and Data Analytics,*

*Economics and Politics*

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| **Learning Goals** | **Learning Objectives** |
| Students will be critical thinkers | ELO1.1. Students will be able to understand core concepts and methods in the key economics disciplines |
| ELO1.2. Students will be able to identify underlying assumptions and logical consistency of causal statements |
| Students will have skills to employ economic thought for the common good | ELO2.1.Students will have a keen sense of ethical criteria for practical problem-solving |
| Students will be technology agile | ELO3.1. Students will demonstrate proficiency in common business software packages |
| ELO3.2. Students will be able to make decisions using appropriate IT tools |
| Students will be effective communicators | ELO4.1.Students will be able to communicate reasonably in different settings according to target audience tasks and situations |
| ELO4.2.Students will be able to convey their ideas effectively through an oral presentation |
| ELO4.3. Students will be able to convey their ideas effectively in a written paper |