**Course descriptor**

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| Title of the course | **Game Theory and Its Applications** | | |
| Title of the Academic Programme | Management | | |
| Type of the course[[1]](#footnote-1) | Elective, available to foreign students | | |
| Prerequisites | Microeconomics I  (Advanced level), Econometrics | | |
| ECTS workload | 6 | | |
| Total indicative study hours | Directed Study | Self-directed study | Total |
| 64 | 164 | 228 |
| Course Overview | The main purpose of the course “Game Theory and Its Applications” is to develop the competence of students in  Microeconomics, with an especial attention to decision-making models including game theory and social  choice theory. The main question for such problems is how to aggregate individual interests into the  unique social or group one. To answer on this question different concepts of fairness are applied and  characterized. The course begins with the simplest game-theoretic models with two participants and then  develops to more complicated n-person, dynamic and cooperative games. Another part of the course is  devoted to social choice theory mainly to voting problems. The problems of existence optimal solutions  and their finding are studied with the help of the modern mathematical methods. | | |
| Intended Learning Outcomes (ILO)[[2]](#footnote-2) | As the result, the student should know:  -based competitive economics models;  -optimality concepts on conflict situations and their  characterizations;  -methods of finding optimal behaviour in some classes of strategic games;  -cost/profit sharing methods;  -voting models. | | |
| Indicative Course Content | Topic 1. The subject and methods of game theory. Conflicts and cooperation, their mathematical  models..Topic 2. Matrix games. Saddle points. Mixed strategies. Minimax Theorem. .Topic 3.  Infinite two-person zero-sum games. Existence theorems Topic 4. Non-cooperative n-person  games. Optimality concepts in non-cooperative games, equilibrium. Game-theoretic models of  oligopolies. Auctions.Topic 5. The mixed extension of non-cooperative games.. Nash’s  Theorem on existence of equilibria in mixed strategies in finite n-person games. Topic 6.  Refiniments of equilibria. Perfect equilibria, strong equilibria, correlated equilibria.Topic 7.  Games with incomplete information. Bayesian equilibria. Topic 8. Games in extensive form.  Zermelo's Theorem on the existence of pure equlibria in finite extensive games with perfect  information. Behavioral strategies Kuhn's Theorem.Topic 9. Dynamic games. Stochastic and  recursive games. Repeated games with complete information.Topic 10. Cooperative games with  transferable utilities. Characteristic functions. Solutions of cooperative games. The core and its  existence. The Shapley value .Topic 11. Cost and profit sharing rules. Egalitarian and utilitarian  rules.Topic 12. Bargaining problems. Axiomatic characterizations of bargainin solutions.Topic  13. Social welfare functions. Arrow’s Theorem and its extensions. Topic 14. Voting theory.  Manipulation of preferences. | | |
| Indicative Assessment Methods and Strategy | Students’ progress will be measured by students’ in-class tests and class participation (20% of the final  grade), home assignments (20%), and a final exam.The final exam will take the form of a 2-hour written  test that amounts to 60% of the final grade. | | |
| Readings / Indicative Learning Resources[[3]](#footnote-3) | Mandatory  1. Peleg B., Sudholter P. (2007) Introduction to the theory of cooperative games. Berlin, Springer-Verlag.  2.Maschler M.,Solan E., Zamir S. “Game Theory”,Cambridge University Press, 2013. —1009 p. — ISBN: 1107005485, 9781107005488  3.Mertens J.-F., Sorin S., Zamir S. “Repeated Games (Econometric Society Monograph)”, 2015. | | |
| Course Instructor |  | | |

1. ***Notes:***

   Type of the course - core (mandatory); optional or elective. [↑](#footnote-ref-1)
2. Intended Learning Outcomes (ILO) - for the academic programmes which are exposed to international accreditation or other forms of external evaluation, the list of ILO must be complemented with “Mapping of Programme and Course/module learning outcomes”. [↑](#footnote-ref-2)
3. Indicative Learning Resources - to be filled either in the Course descriptor or in the Course Syllabus. [↑](#footnote-ref-3)