

Subject code: G.1(1)	Subject name: Game Theory		
Study load: 3 ECTS	Load of contact hours: 60	Study semester: Autumn	Assessment: 5-points grade credit
Objectives:	The goal of this course is to teach basic concepts and methods of game theory and applying that information in practical tasks that are connected with game systems		
Course outline:	<p>Topics covered:</p> <ol style="list-style-type: none"> 1. Brief history of game theory 2. Introduction to the game theory 3. Strategic interactions 4. Normal and Extensive Game Forms 5. Strategies dominance 6. Nash equilibrium 7. Cournot and Hottelling-Downs models 8. Incomplete information games 9. Mixed Strategies 10. Cooperative game theory 11. Core 12. Shapley value <p>Contact lessons will be divided into two parts: lectures and workshops with individual (and team?) tasks.</p>		
Learning Outcomes:	<p>By the end of the course students (in the terms of knowledge, skills, and attitudes) should be able to:</p> <ol style="list-style-type: none"> 1 – critically evaluate game theory basic, games classification, basics of game modeling, principles of game solving; 2 – solve practical problems which are connected with game modeling; 3 – form game strategies. 		
Assessment Methods:	<p>Assessment includes ongoing and interim certification.</p> <p>Ongoing certification is delivered in form of the individual written-oral interview.</p>		

	Interim certification includes theoretical knowledge questionnaire and final project presentation.
Teacher(s):	Vyacheslav Tarasov
Prerequisite subject(s):	<ol style="list-style-type: none"> 1. Probability theory 2. Combinatorics 3. Mathematical statistics 4. Mathematical analysis
Compulsory Literature:	The Strategy of Conflict, Thomas Shelling, 2014
Replacement Literature:	Theory of Games and Economic Behavior, John von Neumann, Oskar Morgenstern.
Participation requirements:	None.
Independent work:	<ol style="list-style-type: none"> 1. Probability Addition and Multiplication 2. Conditional probability 3. Total probability 4. Bernoulli formula 5. Poisson distribution 6. De Moivre-Laplace theorem 7. Probability density function 8. Normal distribution 9. Random variable
Grading criteria scale or the minimal level necessary for passing the subject:	<p>Points distribution:</p> <p>Excellent – Sufficient skills: correct and specific answers without major mistakes, several inaccuracies allowed;</p> <p>Good – Sufficient skills: correct and specific answers without major mistakes, two or three minor mistakes;</p> <p>Satisfactory – General understanding of the subject, several mistakes;</p>

	Unsatisfactory – Insufficient understanding of the subject: wrong answer.
Information about the course:	Room ____, on ____ at ____
1) Date 1	Lecture 1 Classroom presentation: Game Theory History Homework: Overview of Game Theory History
2) Date 2	Game Theory Workshop 1 Students presentations: Basis of game theory Classroom test: Basis of game theory
3) Date 3	Lecture 2 Classroom presentation: Game Theory Elements Homework: Overview of Game Theory Elements
4) Date 4	Game Theory Workshop 2 Students presentation: Game Theory Classroom test: Basis and Elements of Game Theory (3 points)
5) Date 5	Lecture 3 Classroom presentation: Strategic Interactions Homework: Strategic Interactions Analysis (5 points)
6) Date 6	Game Theory Workshop 3 Group classroom task: Game Strategy Generation Classroom test: Strategic Interactions (3 points)
7) Date 7	Lecture 4 Classroom presentation: Normal Game Form Classroom presentation: Extensive Game Form Homework: Differences between Game Forms

8) Date 8	Game Theory Workshop 4 Students presentations: Uses of Normal and Extensive Game Forms
9) Date 9	Lecture 5 Classroom presentation: Random Moves and Lottery Homework: Concept of Lottery
10) Date 10	Game Theory Workshop 5 Students presentations: Concept of Lottery Classroom test: Random Moves and Lottery (3 points)
11) Date 11	Lecture 6 Classroom presentation: Dominant Strategies Classroom presentation: Dominated Strategies Homework: Strategy Generation(5 points)
12) Date 12	Game Theory Workshop 6 Students presentations: Common Game Strategies Classroom test: Dominant and Dominated Strategies (3 points)
13) Date 13	Lecture 7 Classroom presentation: Nash Equilibrium Homework: Overview of Nash Equilibrium
14) Date 14	Game Theory Workshop 7 Classroom test: Nash Equilibrium Theory(3 points) Students presentations: Nash Equilibrium Uses
15) Date 15	Lecture 8 Classroom presentation: Analysis of Hottelling-Downs Model
16) Date 16	Game Theory Workshop 8 Classroom test: Hottelling-Downs Model (7 points)
17) Date 17	Lecture 9

	<p>Classroom presentation: Cournot Model</p> <p>Homework: Analysis of Cournot Model</p>
18) Date 18	<p>Game Theory Workshop 9</p> <p>Classroom test: Uses of Cournot Model</p> <p>Students presentations: Cournot Model in Mixed Strategies</p>
19) Date 19	<p>Lecture 10</p> <p>Classroom presentation: Sequential Equilibrium</p> <p>Classroom presentation: Sequential Equilibrium for Normal Game Form</p> <p>Homework: Analysis of Sequential Equilibrium</p>
20) Date 20	<p>Game Theory Workshop 10</p> <p>Classroom test: Sequential Equilibrium</p> <p>Students presentations: Equilibrium Refining for Extensive Game Form</p>
21) Date 21	<p>Lecture 11</p> <p>Classroom presentation: Probability theory in Game Theory</p>
22) Date 22	<p>Game Theory Workshop 11</p> <p>Classroom test: Probability theory in Game Theory</p> <p>Classroom individual task: Analysis of Winning Strategy in Popular Game</p>
23) Date 23	<p>Lecture 12</p> <p>Classroom presentation: Incomplete Information Games</p> <p>Classroom presentation: Bayesian Equilibrium</p> <p>Homework: Variants of Bayesian Equilibrium</p>
24) Date 24	<p>Game Theory Workshop 12</p> <p>Classroom test: Analysis of Bayesian Games</p> <p>Students presentations: Variants of Bayesian Equilibrium</p>
25) Date 25	<p>Lecture 13</p>

	<p>Classroom presentation: Pure and Mixed Strategies</p> <p>Homework: Applied Mixed Strategies</p>
26) Date 26	<p>Game Theory Workshop 13</p> <p>Individual task: Pure and Mixed Strategies (5 points)</p> <p>Students presentations: Applied Mixed Strategies</p>
27) Date 27	<p>Lecture 14</p> <p>Classroom presentation: Bargaining Problem</p> <p>Homework: Experimental Solutions of Bargaining Problem</p>
28) Date 28	<p>Game Theory Workshop 14</p> <p>Students presentations: Bargaining Problem Applications (5 points)</p>
29) Date 29	<p>Lecture 15</p> <p>Classroom presentation: Cooperative Game Theory</p>
30) Date 30	<p>Game Theory Workshop 15</p> <p>Group classroom task: Cooperative Game Generation</p> <p>Homework: Presentation of Self-Made Cooperative Game (10 points)</p>
31) Date 31	<p>Lecture 16</p> <p>Classroom presentation: The Core</p>
31) Date 32	<p>Game Theory Workshop 16</p> <p>Group classroom task: Solution Concepts of Cooperative Games</p>
33) Date 33	<p>Lecture 17</p> <p>Classroom presentation: Game Publishing Details</p>
34) Date 34	<p>Game Theory Workshop 17</p> <p>Classroom test: Final game design test (7 points)</p> <p>Students presentations: Project Pitch Session (5 points)</p>
35) Date 35	<p>Lecture 18</p> <p>Classroom presentation: Shapley value</p>

36) Date 36	Game Theory Workshop 18 Students presentations: Group projects demonstration (10 points)
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