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Course: Game Theory

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LANGUAGES OF EDUCATION: English

THE SUBJECT The course covers the basics of modern game theory with main applications that are widely used in practice. It also considers the various solution concepts of games and how they can be applied to solve problems occurring in the economy, computer science, and other fields.

THE GOAL of the course includes the formation of the following **abilities** of students:

- ❖ Recognize strategic and extensive representation of games.
- ❖ Formalize real-life economic and business situations into game-theoretic models and be able to make decisions under uncertainty.
- ❖ Solve real-world games using game-theoretical concepts (e.g. Nash equilibrium, Minimax, Pareto optimal solution)

THE MAIN TASK OF THE EDUCATIONAL COURSE

Following the demands of an educational-professional program, after the finishing of this course must

Knowledge:

- ✓ Recognize and be familiar with the most important concepts: minimax solution, Nash equilibrium, Pareto efficiency, etc.
- ✓ Learn about the value of information in games and how it affects outcomes.
- ✓ Identify different settings of interaction in games: cooperative, non-cooperative, antagonistic.

Skills:

- ✓ Model competitive real-world phenomena using concepts from game theory.
- ✓ Analyze game dynamics from the standpoint of rationality and self-interest of the players. Evaluate the equilibrium of the game.
- ✓ Learn how to achieve the best possible outcome in the game and how to avoid a "Prisoners dilemma" situation.

demonstrate such learning outcomes:

Experience:

- ✓ 1. Possess a set of game-theoretic skills that can be applied in real examples.
 - ✓ Use game-theoretical analysis to strategic situations in everyday life.
- ✓ Get familiar with the terminology of game theory which is frequently used in a modern economy and political sciences.

COURSE DURATION: 14 academic hours of lectures; 8 academic hours of seminars

REQUIREMENTS TO STUDENTS: You must be comfortable with mathematical thinking. Relatively little specific math is required; the course involves lightweight probability theory (for example, you should know what a conditional probability is) and very lightweight calculus (for instance, taking a derivative).

