

## Subject card

|                                             |                                                                                              |                                                          |                                         |                                     |                        |            |     |
|---------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------|------------------------|------------|-----|
| Subject name and code                       | Game Theory in Finance, PG_00163388                                                          |                                                          |                                         |                                     |                        |            |     |
| Field of study                              | Finance and Accounting, Information Science and Econometrics, Management, , Sport Management |                                                          |                                         |                                     |                        |            |     |
| Date of commencement of studies             | October 2023                                                                                 |                                                          | Academic year of realisation of subject |                                     | 2024/2025              |            |     |
| Education level                             | undergraduate studies                                                                        |                                                          | Subject group                           |                                     | Optional subject group |            |     |
| Mode of study                               | full-time studies                                                                            |                                                          | Mode of delivery                        |                                     | at the university      |            |     |
| Year of study                               | 2                                                                                            |                                                          | Language of instruction                 |                                     | Polish                 |            |     |
| Semester of study                           | 3                                                                                            |                                                          | ECTS credits                            |                                     | 1.0                    |            |     |
| Learning profile                            | academic                                                                                     |                                                          | Assessment form                         |                                     |                        |            |     |
| Conducting unit                             | Katedra Bankowości i Finansów -> Faculty of Management                                       |                                                          |                                         |                                     |                        |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                           |                                                          | dr Nina Stepanok                        |                                     |                        |            |     |
|                                             | Teachers                                                                                     |                                                          | dr Nina Stepanok                        |                                     |                        |            |     |
| Lesson types                                | Lesson type                                                                                  | Lecture                                                  | Tutorial                                | Laboratory                          | Project                | Seminar    | SUM |
|                                             | Number of study hours                                                                        | 15.0                                                     | 0.0                                     | 0.0                                 | 0.0                    | 0.0        | 15  |
|                                             | E-learning hours included: 0.0                                                               |                                                          |                                         |                                     |                        |            |     |
| Learning activity and number of study hours | Learning activity                                                                            | Participation in didactic classes included in study plan |                                         | Participation in consultation hours |                        | Self-study | SUM |
|                                             | Number of study hours                                                                        | 15                                                       |                                         | 10.0                                |                        | 25.0       | 50  |
| Subject objectives                          | Learn the theoretical and practical aspects of game theory in finance.                       |                                                          |                                         |                                     |                        |            |     |

| Learning outcomes | Course outcome                                                                                                                                                                                                                                                                                                                 | Subject outcome                                                                                                                                                                                                                                                                                                                                             | Method of verification                                                            |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|                   | [IiEL3_K03] The student can work in, co-create and manage a team; adapts his/her behavior and conduct to his/her role in it; is ready to take responsibility for the team and bear the consequences; understands the necessity of regularity and consistency in action; is open to other team members and critical of himself. | Is able to work in, contribute to and manage a team; adapts his/her behaviour and manner to the role he/she plays in it; is ready to take responsibility for the team and bear the consequences; understands the necessity of being systematic and consistent in his/her actions; is open to other team members and critical towards himself/herself.       | [SK1] oral statement/conversation/discussion<br>[SK4] test/exam - oral or written |
|                   | [FiRL3_K06] Creativity: - thinks creatively, is able to go beyond the usual patterns, - is able to think and act in an entrepreneurial manner, - is able to adapt flexibly to the requirements of the environment.                                                                                                             | Creativity: able to anticipate the expectations of other players, able to anticipate the behavior of other players, able to see non-obvious advantages in conflict or cooperative situations.                                                                                                                                                               | [SK1] oral statement/conversation/discussion<br>[SK4] test/exam - oral or written |
|                   | [ZSSML3_W01] The student as advanced knowledge in the discipline of management and quality sciences and understands its interrelationship with other social sciences.                                                                                                                                                          | Has advanced knowledge of the discipline of management and quality sciences and understands its links with other social sciences. Is well acquainted with the main concepts of game theory and is able to see their relationship to other fields of knowledge.                                                                                              | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion |
|                   | [ZARZL3_W13] The student knows advanced methods and techniques of managerial analysis to support the process of economic decision-making, and is familiar with sources of data and information from various fields of social sciences, especially management and quality sciences.                                             | Knows the methods of constructing optimal strategies in games and processes involving two or more parties struggling to realise their interests. Knows the sources of data and information for decision-making in games, including financial management decisions.                                                                                          | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion |
|                   | [IiEL3_W03] The student has advanced knowledge of man as an entity that creates economic structures and institutions.                                                                                                                                                                                                          | Has advanced knowledge of the human being as a subject who creates economic structures and institutions. Has advanced knowledge of the strategic action of a player under conditions of conflict and cooperation.                                                                                                                                           | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion |
|                   | [ZARZL3_U09] The student has the ability to formulate hypotheses and objectives and solve a research problem using the using the literature on the subject and properly selected research methods.                                                                                                                             | Has the ability to formulate hypotheses and objectives and to solve a research problem using the literature on the subject and appropriately selected methods from game theory.                                                                                                                                                                             | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written |
|                   | [ZISZL3_K01] Student is able to critically analyse the received content, with particular emphasis on social and economic sciences.                                                                                                                                                                                             | In a critical manner, the student is able to analyse the received content with particular emphasis on the methods of game theory.                                                                                                                                                                                                                           | [SK1] oral statement/conversation/discussion<br>[SK4] test/exam - oral or written |
|                   | [IiEL3_U07] The student can build formal models of complex economic phenomena and processes, estimate them, carry out their verification, and apply them to modelling, forecasting and optimization of the resources of low-complexity economic institutions, their structure and the course of processes in them.             | The student is able to build formal models of complex economic phenomena and processes, estimate them, carry out their verification and apply them to modelling, forecasting and optimisation of the resources of economic institutions of a low degree of complexity, their structure and the course of processes in them by means of game theory methods. | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written |
|                   | [ZARZL3_K03] The student knows the need to identify important problems, including economic and social issues, and plan ways to solve them.                                                                                                                                                                                     | Is aware of the need to identify important problems, including economic and social ones, and to plan ways to solve them using game theory methods.                                                                                                                                                                                                          | [SK1] oral statement/conversation/discussion<br>[SK4] test/exam - oral or written |
|                   | [ZSSML3_K03] The student knows the need to identify important problems, including economic and social issues, and plan ways to solve them.                                                                                                                                                                                     | Is aware of the need to identify important problems, including economic and social ones, and to plan ways to solve them using game theory methods.                                                                                                                                                                                                          | [SK1] oral statement/conversation/discussion<br>[SK4] test/exam - oral or written |

|                                                                |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                    |                                                                                   |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|                                                                | Course outcome                                                                                                                                                                                                                                                                                                                                   | Subject outcome                                                                                                                                                                                                                                                    | Method of verification                                                            |
|                                                                | [FiRL3_U03] The student can properly analyse the causes, course and effects of specific processes and phenomena in finance and accounting, using advanced theories and relevant social sciences methods. Can identify stakeholders of processes and phenomena from the disciplines of management and quality sciences and economics and finance. | Is able to properly analyse the causes, course and effects of specific processes and phenomena in finance and accounting, using game theory. Is able to identify stakeholders of processes and phenomena under conditions of conflict and cooperation.             | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written |
|                                                                | [ZISZL3_W01] Student has basic knowledge in the discipline of management and quality science and understands its relationship with other social sciences.                                                                                                                                                                                        | Has basic knowledge in the discipline of management science and quality and understands its relations with other social sciences.<br>Knows the basic concepts and concepts of game theory and examples of applications of game theory in various fields.           | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion |
|                                                                | [FiRL3_W04] The student has advanced knowledge of human as an entity that creates economic structures and the motives of his actions.                                                                                                                                                                                                            | Has advanced knowledge of the strategic action of a player under conditions of conflict and cooperation.                                                                                                                                                           | [SW4] test/exam - oral or written<br>[SW1] oral statement/conversation/discussion |
|                                                                | [ZSSML3_U09] The student has the ability to formulate hypotheses and objectives and to solve a research problem using the literature on the subject and appropriately selected research methods.                                                                                                                                                 | Has the ability to formulate hypotheses and objectives and to solve a research problem using the literature on the subject and appropriately selected methods from game theory.                                                                                    | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written |
|                                                                | [ZISZL3_U09] He/she has the ability to formulate hypotheses and goals and solve a research problem using the literature on the subject and appropriately selected research methods.                                                                                                                                                              | Has the ability to formulate hypotheses and objectives and to solve a research problem using the literature on the subject and appropriately selected methods from game theory.                                                                                    | [SU1] oral statement/conversation/discussion<br>[SU4] test/exam - oral or written |
| Subject contents                                               | Basic concepts of game theory;<br>Applications of game theory in economics and finance;<br>Types of strategies according to the availability of information about subjects;<br>Zero-sum games;<br>Variable-sum games;<br>Nash equilibrium, Pareto optimum, prisoner's dilemma.                                                                   |                                                                                                                                                                                                                                                                    |                                                                                   |
| Prerequisites and co-requisites                                | Knowledge of basic concepts in mathematics, economics and finance.                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                    |                                                                                   |
| Assessment methods and criteria                                | Subject passing criteria                                                                                                                                                                                                                                                                                                                         | Passing threshold                                                                                                                                                                                                                                                  | Percentage of the final grade                                                     |
|                                                                | Written test                                                                                                                                                                                                                                                                                                                                     | 51.0%                                                                                                                                                                                                                                                              | 100.0%                                                                            |
| Recommended reading                                            | Basic literature                                                                                                                                                                                                                                                                                                                                 | Teoria gier, Straffin P., Wydawnictwo Naukowe SCHOLAR, 2004<br><br>D. Luce, H. Raiffa. Gry i decyzje. 1994,<br><br>M. Malawski, A. Wieczorek, H. Sosnowska. Konkurencja i kooperacja. Teoria gier w ekonomii i naukach społecznych. Wydawnictwo Naukowe PWN, 1997. |                                                                                   |
|                                                                | Supplementary literature                                                                                                                                                                                                                                                                                                                         | R. Gibbon, Game Theory for Applied Economists, Princeton Press 1999<br><br>M. J. Osborne, A. Rubinstein, A Course in Game Theory, MIT Press 2004                                                                                                                   |                                                                                   |
|                                                                | eResources addresses                                                                                                                                                                                                                                                                                                                             | Adresy na platformie eNauczanie:                                                                                                                                                                                                                                   |                                                                                   |
|                                                                |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                    |                                                                                   |
| Example issues/<br>example questions/<br>tasks being completed |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                    |                                                                                   |
| Work placement                                                 | Not applicable                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                    |                                                                                   |

Document generated electronically. Does not require a seal or signature.