

Course title: Operations Research

ECTS credit allocation (and other scores): 4.00

Semester: spring

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Engineering and technology

Language: English/Polish

Number of hours per semester: 30

Course coordinator/ Department and e-mail:

Type of classes: classes and lectures

Substantive content

CLASSES: Operations research linear models, geometric solution of linear programming problem (LPP). Solution of LPP by means of the simplex method. Application of artificial base methods. Geometric and analytical solution using computer applications, interpretation of the solution, drawing conclusions from the obtained results. Transportation problem, determination of the array form of the transport problem, methods of introducing base solutions of the problem. Solutions of the transportation problem using the method of potentials. Solution of the transportation problem using computer applications, interpretation of the solution. Classical assignment problem, examples and solution of the problem using the Hungarian method. Solving matrix games using the graphical method and by solving an equivalent linear programming problem.

LECTURES: Operations research linear models, geometric solution of linear programming problem (LPP). Theoretical foundations of the Simplex method for solving LPP. Algorithm of the Simplex method. Artificial base methods. Duality theory. Geometric and analytical solution using computer applications, interpretation of the solution, drawing conclusions from the obtained results. Transportation problem, determination of the array form of the transportation problem, methods of introducing base solutions to the problem. Algorithm of the method of potentials of the solution of the transportation problem. Solution of the transportation problem using computer applications, interpretation of the solution. Classical assignment problem, examples and problem solving. Hungarian method. Fundamentals of game theory - two-player zero-sum games. Pure and mixed strategies. Solving matrix games using the graphical method. Equivalence of matrix game and linear programming problems.

Learning purpose: Acquire theoretical knowledge and practical skills and habits in the use of decision-making models.

On completion of the study programme the graduate will gain:

Knowledge: knows typical linear programming and network optimization models

Skills: knows how to create and solve mathematical models of decision-making problems, illustrate and interpret solutions

Social Competencies: knows the limitations of his own knowledge, understands the need to deepen and upgrade knowledge

Basic literature: W. Winston. Operations Research: Applications and Algorithms (4th Ed.). Brooks/Cole. 2004.

Supplementary literature: Arkadiusz Orzechowski, Operations research, Wyd. Warsaw School of Economics, R. 2015

The allocated number of ECTS points consists of:



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Contact hours with an academic teacher: 2,14 ECTS points

Student's independent work: 1,86 ECTS points