COURSE DESCRIPTION CARD - SYLLABUS

Course name
Operational research [S1MNT1>E-BO]

Course

Field of study
Mathematics of Modern Technologies

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of mathematics - calculus.

Course objective

To familiarize students with the scope and purpose of building mathematical models, creating and solving simple examples.

Course-related learning outcomes

Knowledge:
• the student should be able to characterize the basic issues of linear programming, transport and network issues [K_W01(P6S_WG), K_W02(P6S_WG), K_W03(P6S_WG), K_W07(P6S_WG)];
• the student should be able to describe the basic algorithms for solving the problems of: linear, transport and network programming. Identify tasks that can be described / solved by means of transport networks [K_W01(P6S_WG), K_W02(P6S_WG), K_W03(P6S_WG), K_W07(P6S_WG)].

Skills:
• the student should be able to describe a decision problem using a mathematical model [K_U 01(P 6S_U

W),
K_U 02(P 6S_U W), K_U 04(P 6S_U W), K_U 05(P 6S_U W), K_U 06(P 6S_U W), K_U 11(P 6S_U W), K_U 15(P 6S_U K
K_U17(P6S_UU)];
• the student should be able to use an appropriate algorithm to find optimal solutions to basic problems described by a mathematical model [K_U01(P6S_UW), K_U02(P6S_UW), K_U04(P6S_UW), K_U05(P6S_UW), K_U06(P6S_UW), K_U11(P6S_UW), K_U15(P6S_UK), K_U17(P6S_UU)].

Social competences:
• the student is aware of the fact that with the help of a mathematical apparatus it is possible to optimize activities in the field of production preparation [K_K02(P6S_KK), K_K03(P6S_KO)].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures and classes: a test evaluating the practical ability to perform tasks.
3:51-60%
3,5:-70%
4: -80%
4,5:-90%
5: -100%

Programme content

Lectures & Laboratory classes:
Linear programming
Networks: algorithm.
Transportation problem

Course topics

Mathematical programming: linear programming and simplex algorithm.
Networks: algorithm for finding shortest path and maximum flow.

Teaching methods

Lectures: presentation, examples counted on the board;
classes: tasks counted on the board

Bibliography

Basic:
• Kukuła (red.), Badania operacyjne w przykładach i zadaniach, PWN, Warszawa 2004r;
• Z. Jędrzejczyk, K. Kukuła, J.Skrzypek, A. Walkosz, „Badania operacyjne w przykładach i zadaniach”, PWN, 2004.

Additional:
• Edmund Ignasiak, „Badania operacyjne” PWE 2001;
• Simmonard L. Programowanie Liniowe, PWN, Warszawa 1969.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00