COURSE DESCRIPTION CARD - SYLLABUS

Course name

Operations research and optimization theory

Course

Field of study

Logistics

Area of study (specialization)

Corporate Logistics

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

15

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Phd. Tomasz Brzęczek,

tel. 61 665 33 92

e-mail: tomasz.brzeczek@put.poznan.pl

Faculty of Engineering Management,

2 J.Rychlewski Str., room 331,

60-965 Poznań

Responsible for the course/lecturer:

dr inż. Andżelika Libertowska

tel. 61 665 33 90

e-mail: andzelika.libertowska@put.poznan.pl

Faculty of Engineering Management,

2 J. Rychlewski Str.,

60-965 Poznań

Prerequisites

Student knows basics of statistics and probability calculus

Course objective

To teach student planning decisions to optimize inputs or outputs under resouces constraints. To explain ideas of optimization methods and algorithms.

Course-related learning outcomes

Knowledge

1. Student knows typica problems of logistics that can be solved using operation research [P7S_WG_05].

2. Knows graphical method and simplex for linear programming [P7S_WG_04].

3. Knows the methods of multicriteria descrete tasks solving [P7S_WK_01].

4. Knows examples of concave or network programming [P7S_WG_04].

Skills

1. Student can solve optimization tasks using Excel Solver add-in [P7S_UO_01].

2. Understands solving idea of graphical method and simplex, network and transportation algorithms [P7S_UW_04].

3. Solves multi criteria decision tasks with appropriate method [P7S_UO_01].

4. Explains optimum solution and how to achieve and implement it in practice [P7S_UU_01].

Social competences

Assesses solutions observed in practice and explains to logistician how to optimize them [P7S_KR_02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Partial assessment is done at:

a) lectures informally in questions about current topic,

b) tutorials as adnotation about student's work over current topic and his progress.

Pass grades are:

a) lecture grade comes from theory test and problem questions.

b) tutorials grade comes from solving tasks test and fulfiled workcards.

Programme content

1. linear programmes (LP) formulation: product assortment, blending problem, transportation and transshipment, multiperiod scheduling,

2. linear programming. simplex, graphical methods, sensitivity analysis,

3. transportation and transshipment problem, balanced, unbalanced supply-demand,

4. descrete multigoal tasks and methods, multigoal optimality, ranks, optimization degree, AHP,

5. decisions under uncertainty and risk: strategies, news boy, decision tree, spare parts stock,

6. chosen tasks from: CPM, PERT, Gantt, time-cost analysis, minimum spanning tree, the shortest way, maximum flow, non-linear revenue, salesman problem, assignment problems.

Teaching methods

lecture focused at problem, tutorial in solving tasks, case study

Bibliography

Basic

1. Anholcer M., Gaspars H., Owczarkowski A., Ekonometria z Excelem, Wyd. UEP, Poznań 2010.

2. Brzęczek T., Gaspars-Wieloch H., Godziszewski B., Podstawy badań operacyjnych i ekonometrii, Wyd. PP, Poznań 2010.

3. Przykłady i zadania z badań operacyjnych i ekonometrii, Sikora W. (red.), Wyd. UEP, MD, Poznań 2005.

Additional

1. Józefowska J., Badania operacyjne i teoria optymalizacji, Wydawnictwo PP, Poznań 2011.

2. Sikora W. (red.), Badania operacyjne, PWE, Warszawa 2008.

3. Trzaskalik T. (red.), Wprowadzenie do badań operacyjnych z komputerem - CD, PWE, Warszawa 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests, preparation project) [1]	30	1,0

[1] delete or add other activities as appropriate