COURSE DESCRIPTION CARD - SYLLABUS

Course name
Decision problems in logistics I [S2Trans1-LogTr>PDwL1]

Course

Field of study	Year/Semester
Transport	1/1
Area of study (specialization)	Profile of study
Logistics of Transport	general academic
Level of study	Course offered in
second-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	15	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

4,00

Coordinators	Lecturers
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Prerequisites

Knowledge: student has basic knowledge in the field of mathematics, operational research and transport and management Skills: student is able to integrate the obtained information, make their interpretation, draw conclusions, formulate and justify the opinions of the ability to see, match and interpret phenomena Social competencies: the student is aware of the importance and non-technical understanding (including in particular economic and social) aspects and effects of transport activities and decisions

Course objective

Preparing students to manage transport using quantitative tools (methods of optimization and decision support), allowing rational and effective management of the functioning of transport and logistics systems

Course-related learning outcomes

Knowledge:
1. knows advanced methods, techniques and tools used to solve complex engineering tasks and conduct research in a selected area of transport
2. has advanced and in-depth knowledge in the field of transport engineering, theoretical foundations, tools and means used to solve simple engineering problems

Skills:
1. can use analytical, simulation and experimental methods to formulate and solve engineering tasks and simple research problems
2. can assess the usefulness and the possibility of using new achievements (methods and tools) and new products of transport technology

Social competences:
1. understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems

Methods for verifying learning outcomes and assessment criteria
Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lectures: written summary test (open or multiple choice questions).
Laboratory classes: presentation of the results of solved case studies

Programme content

The course will address decision-making problems and how to solve them. Decision-making problems typical of a transport or logistics company will be considered.

Course topics

1. Definitions: decision problem, classification of decision problems, typical decision problems in transport and logistics.
2. The notion of the do-or-buy problem: Definitions and the essence of do-or-buy problems in transport / logistics enterprises (own or foreign logistics, own or foreign transport).
3. Determining the fleet composition: Definitions of the problem of determining the fleet composition in a transport / logistics company; the essence of the problem and its specificity; elements influencing the fleet composition in the enterprise.
4. Multicriteria decision aid: Definitions and the essence of multicriteria decision aid (MCDA), classifications of methods; rules for creating mathematical models; selection of MCDA methods; rules for creating the decision-maker"s preferences; "buy" option - selection and evaluation of the carrier.
5. Vehicle routing problem – basic heuristics, dynamic VRP problem, similar problems (Chinese postman, team orienteering), the difference between the VRP problem and the problem of freight route selection in international shipping.
6. Knapsack problem, bin packing problem, container loading problem.
7. Fleet replacement planning.
8. Facility location problem in transport and logistics, facility network planning problem.

Teaching methods

Lecturing, demonstrating, collaborating

Bibliography

Basic
1. Figueira J., Greco S., Ehrgott M. (eds.): Multiple Criteria Decision Analysis. State of the Art. Surveys. Springer, New York 2016
2. Hillier F., Lieberman G.: Introduction to Operations Research. McGraw Hill Publishing, New York 2002
3. Sikora W. (red.): Badania operacyjne. Polskie Wydawnictwo Ekonomiczne, Warszawa 2008
Additional
1. Malczewski J., Jaroszewicz J.: Podstawy analiz wielokryterialnych w systemach informacji geograficznej. Wyd. PW, Warszawa 2019

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	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)	45	2,00