COURSE DESCRIPTION CARD - SYLLABUS

Course name
Management of road transportation systems [S2Trans1-TrD>ZSTD]

Course

Field of study
Transport

Year/Semester
2/3

Area of study (specialization)
Road Transport

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
15

Number of credit points

3,00

Coordinators

dr hab. inż. Adam Redmer
adam.redmer@put.poznan.pl

Lecturers

Prerequisites

Knowledge: student has a basic knowledge of mathematics and operational research moreover transportation and management as well Skills: student is able to accumulate information, interpret it, reasoning based on it, express and justify opinions, identify, associate and interpret phenomena occurring in a practice Social competence: student is aware of the importance and understands non-technical aspects and effects of transportation processes, including those coming from transportation management

Course objective

To prepare students for management of transportation systems and make them familiar with single and multicriteria methods that allow for optimization of real life transportation systems.

Course-related learning outcomes

Knowledge:
Student knows advanced methods, techniques and tools used in solving complex engineering tasks and conducting research in a selected area of transport

Skills:

Student is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks and simple research problems

Social competences:
Student understands that in the field of transport engineering, knowledge and skills very quickly become obsolete

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: a recapitulation written exam.
Project: presentation in subgroups of a solution to one of the case studies carried out during the semester (assigned randomly).

Programme content

The notion of the optimization and the decision making: introduction to the optimization and decision making (definitions, meanings) – multiple criteria in decision making – the essence of the compromise solutions.
Single criterion optimization: principles of the mathematical modeling, utilization of optimization tools, basic algorithms.
Make-or-buy problem: the definition and the essence of the make-or-buy problem in transportation / logistics (in-house or outside logistics, in-house or outside transport).
Fleet sizing/composiotion problem: the definition of the fleet sizing/composition problem; the essence and characteristic of the problem; factors influencing fleet size /composition.
Multiple criteria optimization: principles of the multiobjective optimization, Pareto-optimal solutions of problems, methods of generating / seeking for Pareto optimal solutions.
Multicriteria Decision Making / Aid – MCDM/MCDA: the definition and the essence of the MCDM/MCDA, classification of MCDM/MCDA methods; principles of decision maker's preferences modeling; selection of an appropriate MCDM/MCDA tools; an application of MCDM/MCDA methods to a „buy" option – carriers selection and assessment; a „make" option – fleet replacement.

Teaching methods

1. Lectures including multimedia presentation, movies
2. Project - case studies

Bibliography

Basic
1. Sikora W. (red.): Badania operacyjne. Polskie Wydawnictwo Ekonomiczne, Warszawa 2008 (in Polish)
2. Hillier F., Lieberman G.: Introduction to Operations Research. McGraw Hill Publishing, New York 2002
3. Wagner H.: Badania operacyjne: zastosowania w zarządzaniu. Polskie Wydawnictwo Ekonomiczne, Warszawa 1980 (in Polish)
4. Figueira J., Greco S., Ehrgott M. (eds.): Multiple Criteria Decision Analysis. State of the Art. Surveys. Springer, New York 2005
Additional
1. Jędrzejczak Z., Kukła K., Skrzypek J., Walkosz A.: Badania operacyjne w przykładach i zadaniach. Wydawnictwo Naukowe PWN, Warszawa 2005 (in Polish)
2. Jacyna M.: Modelowanie wielokryterialne w zastosowaniu do oceny systemów transportowych. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001 (in Polish)

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
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)	30	1,00