

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Decision problems in logistics I		Code 1010612311010617928
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Logistics of Transport	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: 1 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 4 100%
Responsible for subject / lecturer: dr inż. Paweł Zmuda-Trzebiatowski email: pawel.zmuda-trzebiatowski@put.poznan.pl tel. 616652716 Faculty of Transport Engineering ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	student has basic knowledge in the field of mathematics, operational research and transport and management
2	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
3	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
Assumptions and objectives of the course: 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		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. knows advanced methods, techniques and tools used to solve complex engineering tasks and conduct research in a selected area of transport - [T2A_W06] 2. has advanced and in-depth knowledge in the field of transport engineering, theoretical foundations, tools and means used to solve simple engineering problems - [T2A_W01]		
Skills: 1. can use analytical, simulation and experimental methods to formulate and solve engineering tasks and simple research problems - [T2A_U04] 2. can assess the usefulness and the possibility of using new achievements (methods and tools) and new products of transport technology - [T2A_U06]		
Social competencies: 1. understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems - [T2A_K02]		
Assessment methods of study outcomes		
Lectures: written summary test (open or multiple choice questions).		
Laboratory: presentation of the results of solved case studies.		

Course description		
<p>1. Concepts of "optimization" and "decision support": Introduction to optimization and decision support (definitions, interpretations) - multi-criteria in decision making - the essence of compromise solutions</p> <p>2. Monocriterial optimization: Rules for creating mathematical models of decision problems, the use of optimization tools, calculation procedures</p> <p>3. 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)</p> <p>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</p> <p>4. Multi-criteria optimization: The essence of multi-criteria optimization, efficient (pareto-optimal) solutions to the decision problem, techniques of searching for solutions that are efficient</p> <p>5. 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;</p> <p>6. "do" option - fleet replacement planning</p> <p>7. Vehicle routing problem</p>		
Basic bibliography:		
<p>1. Figueira J., Greco S., Ehrgott M. (eds.): Multiple Criteria Decision Analysis. State of the Art. Surveys. Springer, New York 2005</p> <p>2. Hillier F., Lieberman G.: Introduction to Operations Research. McGraw Hill Publishing, New York 2002</p> <p>3. Sikora W. (red.): Badania operacyjne. Polskie Wydawnictwo Ekonomiczne, Warszawa 2008</p>		
Additional bibliography:		
<p>1. Jędrzejczak Z., Kukła K., Skrzypek J., Walkosz A.: Badania operacyjne w przykładach i zadaniach. Wydawnictwo Naukowe PWN, Warszawa 2005</p> <p>2. Jacyna M.: Modelowanie wielokryterialne w zastosowaniu do oceny systemów transportowych. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in classes (according to plan)	45	
2. Consolidation of knowledge / report	30	
3. Consultations	8	
4. Preparation for the exam	15	
5. Participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	55	2
Practical activities	53	2