

COURSE DESCRIPTION CARD

Bialystok University of Technology Faculty of Engineering Management									
Field of study	Management							Degree level and programme type	first degree/ second degree
Specialisation/ diploma path	-							Study profile	-
Course name	Optimization for transport planning							Course code	IS-FM-00098S
								Course type	elective
Forms and number of hours of educational activities	L	C	LC	P	SW	FW	S	Semester	summer
		30						No. of ECTS credits	4
Entry requirements	MS Excel								
Course objectives	<p>Knowledge: The student has knowledge of planning, design and organization of transport systems and optimization transport processes.</p> <p>Skills: Has practical skills in planning, evaluating and improving various transport systems, including optimizing travel routes. Uses methods to optimize routes.</p> <p>Social competences: Demonstrates the ability to identify and resolve problems that arise in the work of a transport planner.</p>								
Course content	<p>Mathematical models of transport problems. A transportation problem (North West Corner method, Least cost method), the issue of allocation (allocation of means of transport), minimization of empty runs and methods of solving them using computer applications. Multicriteria decision problems and methods of solving them (SAW, TOPSIS, AHP), with practical examples of application in planning and organizing transport. Application of graph theory in transport planning problems - methods of optimization the network flows by searching for: the shortest paths in the graph (dynamic programming methods, Dijkstra's algorithm, Danzing's algorithm, minimum spanning tree), the maximum flow in the network, the solution of problem of flow in a network with minimal cost, the solution of the traveling salesman problem.</p>								
Teaching methods	information lecture, problem lecture, subject exercises								
Assessment method	Test, points for the tasks								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
	Knowledge: the graduate knows and understands								
LO1	the theory of transport systems, modeling and optimization of transport processes								
	Skills: the graduate is able to								

L02	independently identify and solve the problem of optimal planning of the transport	
L03	identify the problems of determine routes of the vehicle and indicates ways to solve them	
L04	determine optimal routes	
Social competence: the graduate is ready to		
L05	independently identify and solve the problem in the group of students	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
L01	Test, points for the tasks	C
L02	Test, points for the tasks	C
L03	Test, points for the tasks	C
L04	Test, points for the tasks	C
L05	Test, points for the tasks	C
Student workload (in hours)		No. of hours
Calculation	participation in the classes	30
	participation in the student-teacher sessions	10
	preparation to the exam and presence on it	20
	preparation to pass classes	40
	TOTAL:	100
Quantitative indicators		HOURS
Student workload – activities that require direct teacher participation		40
Student workload – practical activities		70
Basic references	1. Ennio Cascetta, Transportation Systems Analysis, Models and Applications, Springer US, 2009. 2. Lóránt Tavasszy, Gerard De Jong, Modelling Freight Transport, Elsevier, 2014. 3. David A. Hensher, Kenneth J. Button (Eds.), Handbook of transport modelling, Emerald, Inc., 2008. 4. Cynthia Barnhart, Gilbert Laporte (Eds.), Handbooks in Operations Research and Management Science. Transportation, Elsevier B.V., 2007.	
Supplementary references	1. Peter R. White, Public Transport: Its Planning, Management and Operation, Routledge, 2016. 2. Rodney Tolley, Brian John Turton, Transport Systems, Policy and Planning: A Geographical Approach, Routledge, 2014.	
Organisational unit conducting the course	International Department of Logistics and Service Engineering	Date of issuing the programme
Author of the programme	Assoc. Prof. Marta Jarocka, PhD	15.10.2021

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar