



Subject card

Subject name and code		Modelling and Optimisation in Transport, PG_00057088						
Field of study		Transport and Logistics						
Date of commencement of studies		February 2022	Academic year of realisation of subject			2021/2022		
Education level		second-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study		Full-time studies	Mode of delivery			at the university		
Year of study		1	Language of instruction			Polish		
Semester of study		1	ECTS credits			3.0		
Learning profile		general academic profile	Assessment form			exam		
Conducting unit		Zakład Energetyki i Automatyki Morskiej -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)		Subject supervisor		dr hab. inż. Jerzy Kowalski				
		Teachers		dr inż. Marta Drośnińska-Komor dr hab. inż. Jerzy Kowalski				
Lesson types and methods of instruction		Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
		Number of study hours	30.0	0.0	0.0	15.0	0.0	45
		E-learning hours included: 0.0						
Learning activity and number of study hours		Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study	SUM	
		Number of study hours	45	9.0		21.0	75	
Subject objectives		Acquiring general knowledge in the field of modeling and computer simulations used in transportation						
Learning outcomes		Course outcome	Subject outcome			Method of verification		
		[K7_W02] The student has an extensive knowledge of modeling transport processes, including the knowledge necessary to describe and evaluate the functioning of selected elements of the transport system	knows the principles of the transport processes modeling			[SW1] Assessment of factual knowledge		
		[K7_W03] The student has extensive knowledge of: reliability and safety of transport systems and environmental protection in transport	knows how to determine the parameters of reliability and safety of transport systems and environmental protection in transport			[SW3] Assessment of knowledge contained in written work and projects		
		[K7_U04] The student is able to use the known methods and mathematical models, as well as computer simulations to analyze, design and evaluate the functioning of transport systems or their components	analyzes and evaluates the functioning of transport systems or their elements			[SU2] Assessment of ability to analyse information		
		[K7_W01] The student has an extended and deepened knowledge of some areas of mathematics, used to formulate, solve and verify complex problems in transport	is able to formulate and verify complex problems in transport in terms of mathematics			[SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>Transport - basic issues, classification, directions of transport development in the EU and Poland, Modeling - classification, model construction and their complexity, adequacy of models and their validation, simulation of phenomena, analysis of modeling results, Optimization - Optimization and polyoptimization problem, data sets and functions, objective functions, classification, optimization methods, Modeling in transport - modeling of infrastructure, traffic modeling, Optimization in transport - the traveling salesman problem, the problem of routing.</p>											
Prerequisites and co-requisites	overall knowledge in the field of transport systems											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 499 786 533">Subject passing criteria</th> <th data-bbox="798 499 1139 533">Passing threshold</th> <th data-bbox="1150 499 1487 533">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 535 786 568"></td> <td data-bbox="798 535 1139 568">60.0%</td> <td data-bbox="1150 535 1487 568">50.0%</td> </tr> <tr> <td data-bbox="456 571 786 602"></td> <td data-bbox="798 571 1139 602">60.0%</td> <td data-bbox="1150 571 1487 602">50.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade		60.0%	50.0%		60.0%	50.0%		
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Recommended reading	Basic literature	Transport Modelling for a Complete Beginner, Yaron Hollander, CTthink!, 2016,										
	Supplementary literature	Modeling of Transport Demand - Analyzing, Calculating, and Forecasting Transport Demand by V. A Profillidis , G. N. Botzoris , Elsevier Science 2018										
	eResources addresses											
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											