



Subject card

Subject name and code	Railway traffic control systems, PG_00062459						
Field of study	Transport						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Transportation Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Sławomir Grulkowski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		5.0		25.0	75
Subject objectives	The aim of the course is to provide information on rail traffic management systems, rail traffic control and safety devices and the basic principles of rail traffic management						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_K02] makes competent and ethical decisions, caring for the public interest and maintaining economic, social and environmental values		The student is able to name the railway traffic control systems. Can interpret the current motor situation. Can name the devices involved in the control process and locate them in the field		[SK5] Assessment of ability to solve problems that arise in practice		
	[K7_U05] cooperates with other people in the implementation of team work, both as a leader and a team member, effectively achieving set goals		The student solves tasks in a group. He can interpret problems based on information provided in the group		[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
	[K7_K01] recognizes the importance of knowledge related to the field of study in solving cognitive and practical problems		Based on observations and signals, the student is able to interpret the problem and finds a solution.		[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice		
	[K7_W01] identifies in an in-depth way phenomena related to the field of study as well as theories describing them and possible methods of analyzing processes occurring in the life cycle of technical systems		The student is able to interpret the diagrams of stations in the railway traffic control industry. Can design simple solutions at stations and railway crossings. Can interpret the contradictions of movement		[SW1] Assessment of factual knowledge		
	[K7_U02] presents logical and solid arguments regarding the obtained results, through analysis, synthesis of information in various technical contexts, critically approaching their interpretation		The student is able to interpret movement problems and find a solution. Can count the capacity of a section of a railway line and present conclusions. He knows the traffic control systems for local lines.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		

Subject contents	<p>LECTURE</p> <p>Introductory information: General outline and control models, Outline of the structure of the railway network, outline of the organization of railway traffic, route and mileage</p> <p>Control circle and setting circle, description of the control process,Outline of the schematic plan and dependency table, Outline of the formal description of the control process</p> <p>Functional and technical classification, Safety, reliability, traffic efficiency. Standards and recommendations, evaluation indicators</p> <p>Railway signaling</p> <p>Outline of propulsion devices, key devices, semi-automatic linear blockade</p> <p>Relay devices at stations - executive systems</p> <p>Automatic line lock</p> <p>Level crossing</p> <p>Remote motion control</p> <p>Communication of information between track and vehicle</p> <p>Radio traffic control on lightly loaded lines</p> <p>European Train Control System</p> <p>Computer assisted traffic control</p>		
	<p>PROJECT</p> <p>Design of the control system and dependence of a small railway station</p>		
	<p>LABORATORY</p>		
	<p>Identification of contradictory / non-contradictory waveforms</p> <p>Calculation of bandwidth</p> <p>Simulation of the operation of a railway station</p>		
	<p>Operation of the Local Control Center</p>		
Prerequisites and co-requisites	<p>The student should know the railroad infrastructure, especially the structure of railway turnouts.</p> <p>The student should know the basic assumptions of railway traffic engineering.</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	general design of the railway station control system	60.0%	30.0%
	solving a group of tasks	60.0%	30.0%
	test	60.0%	40.0%
Recommended reading	Basic literature	Dąbrowa-Bajon M.: Podstawy sterowania ruchem kolejowym. Funkcje, wymagania, zarys techniki. OWPW, Warszawa 2007. Dyduch J., Kornaszewski M.: Systemy sterowania ruchem kolejowym. Wydawnictwo Politechniki Radomskiej, Radom 2007. Żurkowski A., Pawlik M., Ruch i przewozy kolejowe. Sterowanie ruchem. Warszawa 2010	
	Supplementary literature	Dąbrowa-Bajon M.: Automatyzacja sterowania ruchem kolejowym. Tom 2. WPW, Warszawa 1983. Dąbrowa-Bajon M.: Automatyzacja sterowania ruchem na liniach kolejowych. WPW, Warszawa 1980.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<p>Design of a small station control system</p> <p>Calculation of the deployment of traffic control devices</p> <p>Bandwidth calculations</p> <p>Present the srk system as a Mealy automaton.</p> <p>Introduce the basic types of signaling devices.</p> <p>List the basic functions of the station lock.</p> <p>Describe how to implement a station blockade in key devices.</p> <p>Station operation simulator</p>		
Work placement	Not applicable		

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