



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 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 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 Functional and technical classification, Safety, reliability, traffic efficiency. Standards and recommendations, evaluation indicators Railway signaling Outline of propulsion devices, key devices, semi-automatic linear blockade Relay devices at stations - executive systems Automatic line lock Level crossing Remote motion control Communication of information between track and vehicle Radio traffic control on lightly loaded lines European Train Control System Computer assisted traffic control</p> <p>PROJECT Design of the control system and dependence of a small railway station</p> <p>LABORATORY</p> <p>Identification of contradictory / non-contradictory waveforms Calculation of bandwidth Simulation of the operation of a railway station</p> <p>Operation of the Local Control Center</p>														
Prerequisites and co-requisites	The student should know the railroad infrastructure, especially the structure of railway turnouts. The student should know the basic assumptions of railway traffic engineering.														
Assessment methods and criteria	<table border="1" data-bbox="448 987 1497 1153"> <thead> <tr> <th data-bbox="448 987 794 1025">Subject passing criteria</th> <th data-bbox="794 987 1141 1025">Passing threshold</th> <th data-bbox="1141 987 1497 1025">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 1025 794 1086">general design of the railway station control system</td> <td data-bbox="794 1025 1141 1086">60.0%</td> <td data-bbox="1141 1025 1497 1086">30.0%</td> </tr> <tr> <td data-bbox="448 1086 794 1124">solving a group of tasks</td> <td data-bbox="794 1086 1141 1124">60.0%</td> <td data-bbox="1141 1086 1497 1124">30.0%</td> </tr> <tr> <td data-bbox="448 1124 794 1153">test</td> <td data-bbox="794 1124 1141 1153">60.0%</td> <td data-bbox="1141 1124 1497 1153">40.0%</td> </tr> </tbody> </table>			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%
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Recommended reading	Basic literature Supplementary literature eResources addresses	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 Dąbrowa-Bajon M.: Automatyzacja sterowania ruchem kolejowym. Tom 2. WPW, Warszawa 1983. Dąbrowa-Bajon M.: Automatyzacja sterowania ruchem na liniach kolejowych. WPW, Warszawa 1980. Adresy na platformie eNauczenie:													
Example issues/ example questions/ tasks being completed	Design of a small station control system Calculation of the deployment of traffic control devices Bandwidth calculations Present the srk system as a Mealy automaton. Introduce the basic types of signaling devices. List the basic functions of the station lock. Describe how to implement a station blockade in key devices. Station operation simulator														
Work placement	Not applicable														

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