



Subject card

Subject name and code	Railway traffic control systems, PG_00062459										
Field of study	Transport										
Date of commencement of studies	February 2026	Academic year of realisation of subject		2026/2027							
Education level	second-cycle studies		Subject group		Specialty subject group 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	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 -> Faculties of Gdańsk University of Technology										
Name and surname of lecturer (lecturers)	Subject supervisor Teachers		dr inż. Sławomir Grulkowski								
Lesson types	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_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					
	[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_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					

Subject contents	<p>Course content – lecture</p> <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	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"> <thead> <tr> <th data-bbox="446 1035 774 1073">Subject passing criteria</th><th data-bbox="774 1035 1144 1073">Passing threshold</th><th data-bbox="1144 1035 1487 1073">Percentage of the final grade</th></tr> </thead> <tbody> <tr> <td data-bbox="446 1073 774 1111">general design of the railway station control system</td><td data-bbox="774 1073 1144 1111">60.0%</td><td data-bbox="1144 1073 1487 1111">30.0%</td></tr> <tr> <td data-bbox="446 1111 774 1149">solving a group of tasks</td><td data-bbox="774 1111 1144 1149">60.0%</td><td data-bbox="1144 1111 1487 1149">30.0%</td></tr> <tr> <td data-bbox="446 1149 774 1185">test</td><td data-bbox="774 1149 1144 1185">60.0%</td><td data-bbox="1144 1149 1487 1185">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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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												
Practical activites within the subject	Not applicable												

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