GDAŃSK UNIVERSITY OF TECHNOLOGY

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	
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	dr inż. Sławomir Grulkowski	
	Teachers		

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	Course content – lecture 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 PROJECT Design of the control system and dependence of a small railway station LABORATORY Identification of contradictory / non-contradictory waveforms Calculation of bandwidth Simulation of the operation of a railway station Operation of the Local Control Center
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

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	

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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