GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Automatics of Transportation Systems, PG_00031756
Field of study	Automation, Robotics and Control Systems

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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Electrified Transportation -> Faculty of Electrical and Control Engineering
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Skibicki
	Teachers	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60	15.0	25.0	100

Subject objectives	The aim of the subject is to master the knowledge of widely understood automation in transport systems. The student learns the rules, systems and devices for controlling the railway traffic, urban transport and road traffic, as well as the possibilities of their automation. In addition, basic issues related to the automation of electric vehicle operation will be presented.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U04	Using bibliographic resources regarding the subject of the subject.	[SU2] Assessment of ability to analyse information
	K7_U03	Preparing a report on laboratory tests.	[SU5] Assessment of ability to present the results of task
	K7_W11	Knows automatic driving systems for rail vehicles.	[SW1] Assessment of factual knowledge
	K7_W06	Recognize areas of possible application of automation elements in transport.	[SW1] Assessment of factual knowledge
	K7_U07	Identify areas of automation in transport systems.	[SU3] Assessment of ability to use knowledge gained from the subject

Subject contents	LECTURE
	Traffic and railway traffic control devices: railway signaling. Techniques of railway traffic protection, track occupation control systems. Railway traffic management, the concept of linear and semi-automatic interlocking, transmission of information between the track and the vehicle. European rail traffic control system ETCS, definition, standards, technical equipment. Railway radio systems. Composition continuity control systems. Methods of traffic control on low-loaded lines. Railway crossing protection systems, categories of railway line intersections with vehicular roads, automatic crossing signaling, computer control, methods of detecting the presence of vehicles at the crossing. Automation of marshalling yards, goals and rules of timing, track brakes, steering. Motion control in metro systems. Full automation of rail transport, unmanned and unmanned systems, automatic freight transport, Cargomover system. Automatic systems used in urban transport. Methods of controlling traffic lights. Variable traffic signs and signaling devices, traffic detectors. Methods of vehicle location, automatic reading of license plates, dynamic traffic control systems. Traffic control in large urban agglomerations. Control of pedestrians movements. Full automation of traffic. Control of power supply and vehicle operation. Controlling transport behaviors and habits. Unconventional transportations systems. LABORATORY Track occupancy control systems; SHP sensor; Traffic control between stations; Traffic control at stations; Marshalling yard.

Prerequisites and co-requisites	Knowledge of the basics of electrical engineering and electronics.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports from laboratory exercises	60.0%	40.0%
	Exam from the lecture	60.0%	60.0%

Recommended reading	Basic literature	1. Vuhic V.: Urban transit, systems and technology. Viley 2007. 2. Rojek A.: Tabor i trakcja kolejowa. Warszawa: KOW 2010. 3. Bergiel K., Karbowiak H.: Automatyzacja prowadzenia pociągu. Łódź, EMI-PRESS 2005. 4. Dyduch J., Pawlik M.: Systemy automatycznej kontroli jazdy pociągu. Radom, Wyd. PR 2002. 5. Dyduch J., Kornaszewski M.: Systemy sterowania ruchem kolejowym. Radom, Wyd. PR 2004. 6. Dąbrowa-Bajon M.: Podstawy sterowania ruchem kolejowym. Warszawa, OWPW 2002. 7. Leślo M., Guzik J.: Sterowanie ruchem drogowym cz. I i II. Gliwice, WPS 2000. 8. Praca zbiorowa: Interoperacyjność systemu kolei Unii Europejskiej. Warszawa: KOW 2015. 9. Pawlik M.: Europejski system zarządzania ruchem kolejowym. Warszawa: KOW 2015. 10. Chromański W., Grabarek I., Kozłowski M., Czerepicki A., Marczuk K.: Pojazdy autonomiczne i systemy transportu autonomicznego. Warszawa: PWN 2020. 11. Modelewski K.: Inteligentny transport. Brzezia Łąka: Poligraf 2018. 12. Mężyk A., Zamkowska S.: Problemy transportowe miast, stan i kierunki rozwiązań. Warszawa: PWN 2019. 13. Wesołowski J.: Miasto w ruchu, dobre praktyki w organizowaniu transportu miejskiego. Łódź: Instytut Spraw Obywatelskich 2008. 14. Żurkowski A., Pawlik M.: Ruch i przewozy kolejowe, sterowanie ruchem. Warszawa: KOW 2010. 15. Dyduch J., Kornaszewski M.: Komputerowe systemy sterowania ruchem kolejowym. Radom: UTH 2014. 16. Barański S., Karbowiak H.: Teoria i aplikacje systemów bezpiecznego prowadzenia pociągu. Łódź: WPŁ 2016.
	Supplementary literature	Periodics: Technika Transportu Szynowego; Transport Miejski i Regionalny
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Traffic control in cities; Control of traffic on railway lines; Work of an autonomous vehicle;

Work placement	Not applicable

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