



Subject card

Subject name and code	Roads & Railways, PG_00072594						
Field of study	Civil Engineering						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study 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		English		
Semester of study	1		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. Michał Urbaniak				
	Teachers		dr inż. Jacek Alenowicz dr inż. Kamila Szwaczekiewicz dr inż. Joanna Wachnicka dr inż. Michał Urbaniak dr inż. Marcin Stienss				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=3933						
	Moodle ID: 3933 Roads & Railways / WILiŚ / CivilEng. / stacj. / st. 2 / sem. I / zima / 2026-2027 https://enauczanie.pg.edu.pl/2025/course/view.php?id=3933						
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		3.0		27.0	75
Subject objectives	The course aims to provide advanced knowledge of the construction and structural design of roads and railways, including the basic components of transport infrastructure, materials, construction technologies, and conditions of use and operation. It develops students' understanding of the relationships between structural solutions, material properties, technical requirements, and operating conditions of transport infrastructure. During laboratory classes, students select and develop structural solutions for road pavements, railway track structures, and platforms.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U05] evaluates and critically verifies documentation, results of calculations, tests, measurements and monitoring of advanced structures and buildings		Acquires the ability to analyse and critically verify structural solutions for roads and railways, as well as relevant documentation and calculation results.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task		
	[K7_W02] explains the meaning and interdependence of the key components describing systems and processes in civil engineering and related fields, using in-depth knowledge in line with the main trends in the development of scientific disciplines related to the field of study		Acquires advanced knowledge of the construction and structural design of roads and railways, including the materials used and construction technologies.		[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture		
	1. Road pavement structure and pavement subgrade. 2. Aggregates, asphalt binders, and asphalt mixtures used in road pavement construction. 3. Construction technologies for asphalt and concrete pavements. 4. Construction and basic components of road and railway infrastructure, transport systems, and the interrelationships between their components. 5. Structural design of railways, including railway track structure, subgrade, track layouts, and platforms. 6. Materials and technologies used in railway infrastructure construction. 7. Fundamentals of road pavement assessment, maintenance, and rehabilitation.		
	Course content – laboratory		
	1. Selection and development of a road pavement structure, taking into account the properties of the materials used. 2. Selection and development of structural solutions for railway track structures and platforms.		
Prerequisites and co-requisites	Prerequisites: Basic knowledge of road and railway infrastructure, particularly its construction, basic structural components, and the functioning of transport systems. Additional requirements: Basic knowledge of materials and technologies used in road and railway construction, technical drawing and AutoCAD, as well as the ability to use technical documentation and perform basic engineering calculations.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture test	60.0%	80.0%
	Completion of laboratory assignments	100.0%	20.0%
Recommended reading	Basic literature	1. Cedergren H.R.: Drainage of Highway and Airfield Pavements. New York: John Wiley & Sons, 1974. 2. Brockenbrough R.L., Boedecker K.J.: Highway Engineering Handbook. 2nd ed. New York: McGraw-Hill, 2003. 3. Commission Regulation (EU) No 1299/2014 of 18 November 2014 on the technical specifications for interoperability relating to the infrastructure subsystem of the rail system in the European Union (Text with EEA relevance). Consolidated text. 4. Esveld C.: Modern Railway Track. 2nd ed. Zaltbommel: MRT-Productions, 2001.	
	Supplementary literature	1. Błażejowski K., Styk S.: Technologia warstw asfaltowych. Poradnik. Warsaw: Wydawnictwa Komunikacji i Łączności, 2004. 2. Szydło A.: Nawierzchnie drogowe z betonu cementowego. Teoria, wymiarowanie, realizacja. Kraków: Polski Cement, 2004. 3. Edel R.: Odwodnienie dróg. 3rd revised edition. Warsaw: Wydawnictwa Komunikacji i Łączności, 2006. 4. Cedergren H.R.: Drainage of Highway and Airfield Pavements. New York: John Wiley & Sons, 1974.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Example topics: • Basic components and structural solutions of transport infrastructure in rail and road transport. • Structural design of railways – railway track structure, subgrade, track layouts and platforms. • Materials and technologies used in railway infrastructure construction. • Structural design of roads and basic layers of road pavements. • Materials and technologies used in road construction. Laboratory assignments: • Selection and development of a road pavement structure, taking into account the properties of the materials used. • Selection and development of a structural solution for a railway track layout with a platform.		
Practical activities within the subject	Not applicable		

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