GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Trasport infrastructure design, PG_00072509		
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	Polish
Semester of study	1	ECTS credits	2.0
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. Kamila Szwaczkiewicz	
	Teachers	mgr inż. Piotr Omieczyński dr inż. Anna Gobis mgr inż. Konrad Biszko dr inż. Cezary Szydłowski dr inż. Marcin Budzyński dr inż. Kamila Szwaczkiewicz dr inż. Marcin Stienss	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	0.0	30

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 9315 Projektowanie infrastruktury transportowej - 1B_II - 2026/2027
https://enauczanie.pg.edu.pl/2025/course/view.php?id=9315

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	30	2.0	18.0	50

Subject objectives

Traffic Engineering: The objective of this course is to present the operating principles of transport interchange hubs, the criteria for optimizing the selection of road design solutions, and safety standards for specific elements of road infrastructure.

Road Construction: The objective of this course is to present the principles of diagnosing, maintaining, and managing road pavements.

Railways: The objective of this course is to teach students how to design passenger rail infrastructure and transit hubs: dimensioning tracks and platforms, ensuring access for people with limited mobility, arranging platform facilities, and integrating with Park & Ride facilities.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U03] uses, to a deeper extent, appropriately selected analytical, numerical and experimental tools and methods to carry out tasks in the construction industry	Students apply, to a greater extent, appropriately selected analytical, numerical, and experimental tools and methods to carry out tasks related to the design of transportation infrastructure	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K7_W03] demonstrates in-depth preparation in the application of analytical, numerical and experimental tools and methods to tasks in the construction industry	The student demonstrates an in-depth understanding of the application of analytical, numerical, and experimental tools and methods to carry out tasks related to the design of transportation infrastructure	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation

Subject contents

Course content – lecture

- **Traffic Engineering:** Types of transport interchange hubs; principles for evaluating transport interchange hubs. Multi-criteria analysis as a tool for optimizing the selection of road design solutions. Safety of selected elements of road infrastructure.
- **Road Construction:** Basic diagnostic methods for road pavements. Advanced diagnostic methods for road pavements. Technologies for pavement maintenance and reconstruction. Road pavement management systems.
- **Railways:**Designing the cross-section of the track adjacent to the passenger platform, taking into account safe distances between the structure and the track centerline. Designing the length, width, and height of side-platforms and island platforms based on passenger flow. Design of access routes to platforms, rail-level crossings, footbridges, tunnels, ramps, and stairs, taking into account the needs of people with limited mobility. Placement of railway shelters, passenger information systems (fences, signs, tactile paths), and platform lighting and drainage. Design of transfer zones (urban rail transit, buses, Park & Ride facilities) directly linked to the station infrastructure.

Course content – project

- **Traffic Engineering:** Analysis and classification of transport users, including the identification of their needs. A methodology for assessing accessibility as an integral part of the design process for transport infrastructure elements. Conducting an accessibility audit of a selected transport hub (project).
- **Road Construction:** The course focuses on the design of a road surface repair or reconstruction project, taking into account the diagnostic data provided.
- **Railways:**Designing the cross-section of the track adjacent to the passenger platform, taking into account safe distances between the structure and the track centerline. Designing the length, width, and height of side-platforms and island platforms based on passenger flow. Design of access routes to platforms, rail-level crossings, footbridges, tunnels, ramps, and stairs, taking into account the needs of people with limited mobility. Placement of railway shelters, passenger information systems (fences, signs, tactile paths), and platform lighting and drainage. Design of transfer zones (urban rail transit, buses, Park & Ride facilities) directly linked to the station infrastructure.

Prerequisites and co-requisites

- **Traffic Engineering:** Roads and Highways I, Roads and Highways II
- **Road Construction:** Roads and Highways I, Roads and Highways II
- **Railways:** Railways I and II

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
project	100.0%	50.0%
test from lecture	60.0%	50.0%

Recommended reading	Basic literature	• **Traffic Engineering:** 1. M. Sitarz, Transport w epoce zróżnicowanych potrzeb. Przesiadka bez barier, Akademia WSB, Dąbrowa Górnicza 2023 2. WR-D-43-1 Wytyczne projektowania infrastruktury transportu zbiorowego. Część 1: Planowanie infrastruktury transportu zbiorowego 3. Ustawa z dnia 19 lipca 2019 r. o zapewnianiu dostępności osobom ze szczególnymi potrzebami (Dz.U. 2019 poz. 1696) • **Road Construction:** 1. Bogdan Stypułkowski "Zagadnienia utrzymania i modernizacji dróg i ulic", WKŁ 2000; 2. GDDKiA "Wytyczne Diagnostyki Stanu Nawierzchni"; 3. Wytyczne WR-D serii 80. • **Railways:** 1. Bałuch H.: *Układy geometryczne połączeń torów*. WKŁ. Warszawa 1989. 2. Grulkowski S., Kędra Z., Koc W., Nowakowski M.: Drogi szynowe. Wyd. Pol. Gdańskiej, Gdańsk 2013 3. Koc W.: *Elementy teorii projektowania układów torowych*. Politechnika Gdańska 2004. 4. Sysak J.: *Drogi kolejowe*. PWN, Warszawa 1986. 5. Rozporządzenie Ministra Infrastruktury z dnia 17 września 2026 r. w sprawie warunków technicznych, jakim powinny odpowiadać budowle kolejowe i ich usytuowanie 6. Id -1 Warunki techniczne utrzymania nawierzchni na liniach kolejowych Warszawa, 2005. 7. Szczegółowe warunki techniczne dla modernizacji lub budowy linii kolejowych do prędkości Vmax ≤ 200 km/h (dla taboru konwencjonalnego) / 250 km/h (dla taboru z wychylnym pudłem) – TOM I - DROGA SZYNOWA (Załącznik do uchwały Nr 442/2019 Zarządu PKP Polskie Linie Kolejowe S.A. z dnia 9 lipca 2019 r.) 8. Szczegółowe warunki techniczne dla modernizacji lub budowy linii kolejowych do prędkości Vmax ≤ 200 km/h (dla taboru konwencjonalnego) / 250 km/h (dla taboru z wychylnym pudłem) – ZAŁĄCZNIK ST1-T1-A6 (Załącznik Nr 1 do uchwały Nr 1086/2017 Zarządu PKP Polskie Linie Kolejowe S.A. z dnia 13 listopada 2017 r.)
	Supplementary literature	• **Railways:** 1. Bogdaniuk B.: Modernizacja dróg kolejowych przy ich elektryfikacji. WKŁ, Warszawa 1988. 2. Bogdaniuk B., Towpik K.: Budowa, modernizacja i naprawy dróg kolejowych. KOW, Warszawa 2010. 3. Massel A..: Projektowanie linii i stacji kolejowych. PKP Polskie Linie Kolejowe, Warszawa 2010. 4. Massel A., Wołek M.: Podręcznik rewitalizacji linii kolejowych. Samorząd Województwa Pomorskiego, Gdańsk 2007.
	eResources addresses	

Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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