



## Subject card

Subject name and code	High speed railways, PG_00041392						
Field of study	Civil Engineering						
Date of commencement of studies	February 2025			Academic year of realisation of subject		2025/2026	
Education level	second-cycle studies			Subject group		Optional 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		2.0	
Learning profile	general academic profile			Assessment form		assessment	
Conducting unit	Department of Railway Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor			dr hab. inż. Piotr Chrostowski			
	Teachers						
Lesson types and methods of instruction	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						
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		5.0		15.0	50
Subject objectives	The aim of the course is to familiarize students with the High-Speed Rail system using examples of countries operating this type of rail transport. Students learn about the current state of development of the HSR system in the world and also in Poland. The principles of HSR design (track structure and geometric layouts) are discussed. The principles of traffic controlling within the ERTMS system are presented. The students learn about methodology related to solving the train kinematic equation, taking into account train characteristics (tractive force) and the impact of resistance.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U15] has advanced skills in civil engineering within offered specialization/profile	<p>The student has got the ability to characterize the High-Speed Rail system on the background of conventional rail transport.</p> <p>The student is able to design geometrical layouts of railway lines taking into account the characteristics of fast train traffic.</p> <p>The student is able to build and solve the theoretical model of the train motion kinematic equation taking into account both traction characteristics and movement resistance of high speed trains.</p>	[SU1] Assessment of task fulfilment
	[K7_W15] has deep and adequate knowledge of civil engineering, within offered specialization and profile	<p>The student achieves a basic knowledge of High-Speed Railways. Has knowledge of the advancement of HSR systems in the world (including Poland).</p> <p>The student understands the rules and knows the principles of traffic control for high-speed trains. The student is able to point to the technical characteristics of infrastructure dedicated to high speed.</p> <p>The student has knowledge about the designing of geometric layouts dedicated to high-speed trains.</p>	[SW1] Assessment of factual knowledge
	[K7_K04] understands the necessity of dissemination civil engineering knowledge in the society and to support the professional ethos of a civil engineer	The student acquires the skills to transfer knowledge about social needs related to the development of the High Speed Rail network. Can explain the principle of interoperability in the context of integrating rail transport between neighboring countries.	[SK4] Assessment of communication skills, including language correctness
Subject contents	<p>Lectures content:</p> <ul style="list-style-type: none"> <li>- History, current status and prospects of the High Speed Rail system.</li> <li>- Design issues of High Speed Railway geometric systems.</li> <li>- Issues of theory and control systems of railway traffic on KDP lines.</li> <li>- Kinematic calculations of high-speed train</li> </ul> <p>As part of the design classes, students prepare a design of a complex geometric layout of a railway line dedicated to high-speed trains. Students use standards typical and common for HSR systems. Design classes are finalized by submitting a report in which the assumptions and implementation of the project for given operating conditions and parameters are presented.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Presentation	50.0%	50.0%
	Report	50.0%	50.0%
Recommended reading	Basic literature	<p>Towpik K., Koleje Dużych Prędkości. Infrastruktura drogi kolejowej, Politechnika Warszawska 2012</p> <p>Żurkowski A., Pawlik M. Ruch i przewozy kolejowe. Sterowanie ruchem, PKP PLK, Warszawa 2010</p> <p>Grulkowski S., Kędra Z., Koc W., Nowakowski M., Drogi Szynowe, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2013</p>	

	Supplementary literature	Towpik K., Infrastruktura transportu kolejowego, Politechnika Warszawska 2009  Bogdaniuk B., Massel A., Podstawy transportu kolejowego, Politechnika Gdańska 1999  Esveld C., Modern railway track, MRT-Productions, Delft 2001
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Explanation of differences between conventional rail system and High-Speed Rail system  Characteristics and development of HSR in the world and in Poland  Design principles for HSR geometric layouts  Kinematic calculations for train traffic in the HSR system	
Work placement	Not applicable	

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