Subject card

Subject name and code	Designing roads, streets and junctions, PG_00059873
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	3.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Transportation Engineering -> Faculty of Civil and Environmental Engineering

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Budzyński
	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	30.0	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 acquire knowledge in the design of expressways, especially interchanges.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U07] is able to design elements of road network, to apply the rules of traffic organisation and control, taking into account economy, safety and environmental factors,	Knowledge and skills in designing road infrastructure elements, traffic organization and traffic control systems. The student has theoretical and practical knowledge in this area. The student is able to take into account aspects of economics, safety and environmental protection in road design.	[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	[K7_W15] has deep and adequate knowlege of civil engineering, within offered specialization and profile	Obtaining knowledge and competences in the field of road infrastructure design.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[K7_W06] has expanded knowledge about traffic theory, planing of road networks and junctions design, regarding economy, safety and environmental aspects	Knowledge and skills in the design and planning of road networks, including the design of interchange. The student has theoretical and practical knowledge in this area. The student is able to take into account aspects of economics, safety and environmental protection in road design.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[K7_W14] knows and applies building codes and obeys the Construction Law; has knowledge on environmetal impact of investment realisation	Knowledge of construction law and the impact of road investments on the natural and social environment.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[K7_K01] is aware of necessity of professional competences improvement; obeys the professional ethics code	Understanding the need to improve qualifications and increase competences in the field of road infrastructure design. Conduct in accordance with the principles of professional ethics.	[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work

Subject contents	Lectures
	1. Design of expressway sections, plan, profile, cross-section
	2. General information about interchanges
	3. Detailed analysis of design elements for selected types of interchanges
	4. Capacity of interchanges
	5. Problems of safety, economics and environmental protection in road investments
	6. Design errors
	7. Road barriers and other expressway equipment
	Projects
	1. BIM elements in the design of expressways
	2. Modeling of the expressway body
	3. Design of interchanges elements.

Prerequisites and co-requisites	Knowledge obtained at the stage of first-cycle studies in the subjects Road and Motorway Construction, Design of intersections and interchanges.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Passing the project	60.0%	80.0%
	Attendance	80.0%	20.0%

Recommended reading	Basic literature	Collective work, ed. R. Krystek Road and motorway junctions, WKiŁ 2008
		Intechanges design guidelines. Patterns and Standards. Ministry of Infrastructure. 2022
		Intersection design guidelines. Patterns and Standards. Ministry of Infrastructure. 2022
		Guidelines for designing rural roads. Patterns and Standards. Ministry of Infrastructure. 2022
	Supplementary literature	Blue Book. Road infrastructure, Jaspers, 2008
		AASHTO. Policy on Geometric Design of Highways and Streets. 2018.US
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Sketch a diagram of a road junction for the given parameters 2. Describe the cost-benefit analysis method, indicate its advantages and disadvantages 3. List the scope of the feasibility study for a road investment 4. Characterize the risk management method for the road network 5. Design errors for junctions and sections of expressways that may cause hazards 6. Determine the capacity of selected elements of a road junction 8. For the examples given, determine the problems in the functioning of nodes.	
Work placement	Not applicable	

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