



## Subject card

Subject name and code	Urban and road engineering, PG_00052815						
Field of study	Architecture						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-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			e-learning		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		Mariusz Gruchała				
	Teachers		Mariusz Gruchała Patrik Delegowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 30.0						
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		2.0		18.0	50
Subject objectives	<p>The aim of a subject is to achieve the effects of study in components:</p> <p>The aim of <b>Urban engineering</b> - introduction to the technical infrastructure sanitary sewer, stormwater, watersupply system; knowing their functioning in different scales, understanding the technical and economic aspects and design principles.</p> <p>The aim of <b>Road engineering</b> - introduction to the urban transport.</p>						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U01] is able to use the experience gained during studies to critically analyze the conditions and formulate conclusions for design in an interdisciplinary context		is able to use the experience gained during studies to critically analyze the conditions and formulate conclusions for design in an interdisciplinary context		[SU2] Assessment of ability to analyse information		
	[K6_W01] knows and understands construction problems, building and engineering issues related to building design; principles, solutions, constructions and building materials used in simple engineering tasks in the field of architectural and urban design		knows and understands engineering issues related to building design; principles, solutions used in simple engineering tasks in the field of architectural and urban design		[SW1] Assessment of factual knowledge		

<p>Subject contents</p>	<p><b>Urban engineering.</b> Lectures on urban engineering introduce the subject of the functioning of the city, integrally connected with its equipment with engineering and technical elements related to human existence and its environment.</p> <p>Aim: Mastering knowledge of the functioning of technical infrastructure in urban space necessary for a public space designer. Preparation of the basis for cooperation between an architect and an engineer designing a given branch of infrastructure.</p> <p>1. (90 min.) <b>Public space and the operation of urban infrastructure</b>; three-dimensional structure of the city; technical infrastructure as a strategic tool of the city, region, country; Technical infrastructure - a factor that develops or degrades space. Infrastructural thresholds. Multifunctionality of positive solutions in the field of technical infrastructure (cubature, urban, spatial and technological) that build the cultural landscape of the city; examples.</p> <p>2. (90 min.) <b>Transformations of public transport</b> and communication - new types of urban space in the context of social and climate changes, new technologies; modern introduction of greenery in the city, systems facilitating (or supporting) plant vegetation, optimal use of space within Compact City, urban greenery and climate protection. Future trends. Transformation of communication routes (roads, tram lines) into green areas - examples from the USA, Belgium, South Korea.</p> <p>3. (90 min.) <b>Types of municipal technical infrastructure</b> - Technical infrastructure - division into categories and types; types of cubature objects belonging to a given infrastructure, transmission lines, collection points assigned to the appropriate category; Information in public space - road signs, location information, guides other than signs and poles for large-format information, greetings, gates; Infrastructure on dc design maps, for information purposes - markings, information validity; Information systems and sources necessary for project preparation.</p> <p>4. (90 min.) <b>Water</b> - The water cycle in nature; water - types, definitions, functions, Utility water and its infrastructure - water abstraction, water treatment, water towers, transmission lines, collection points, water in the urban space, water recovery; water as an extinguishing element - examples Innovative solutions - floating crops, stackable hydroponic cultivation examples. Rainwater - flood and drought threats, natural and construction measures. The role of rainwater catchment and shaping buildings and public space</p> <p>5. (90 min.) <b>Water</b> - melioration, regulations, retention reservoirs, energy damming, artificial watercourses, relief channels - natural and environmental context; Water law, water protection rules, ownership rules, flood protection. <b>Sewerage</b> - catchment, sewage transport network (sanitary, rainwater, combined sewage), conduits, relieving structures and sewage treatment plant - the impact of the sewage system on the environment and water management in the region. Contemporary wastewater treatment systems - local and city-wide sewage treatment plants Contemporary trends related to the reduction of target wastewater. Reclamation of degraded areas.</p> <p>6. (90 min.) <b>Garbage, waste</b> - definitions, classification of waste; obligations of a waste producer, obligations of a waste owner. Types of environmental pollution - atmospheric, soil, aquatic environment (e.g. rainwater, surface, underground and land waters), light pollution, outer space - pollution neutralization systems,</p> <p>Types of garbage collection, types of liquidation /recovery/ transformation - landfills, landfill insulation, waste incineration, recycling. Changes to the waste disposal system. Municipal segregated garbage cans - a biological and aesthetic challenge.</p> <p>7. (90 min.) <b>Power</b> industry - energy production, node facilities, transformer stations, transmission lines, collection points; energy demand - consumers; transmission easement; producers, operators, energy distributors in Poland, energy generation systems - present and the nearest future, advantages and disadvantages, environmental threats; alternative and futuristic systems of obtaining energy - projected impact on public space.</p> <p>8. (45 min.) <b>Internet, satellite communication, defense cubature facilities</b>, information processing stations, masts and relay facilities, Spatial infrastructure: transmission lines, connections and controllers, air corridors, Military areas, shelters, highways and civilian areas designated for military use</p> <p><b>Road engineering:</b></p> <p>1. Road routing. Basic parameters in road designing,</p> <p>2. Road designing in site plan, road designing in longitudinal and cross-sectional.</p>
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	<p>3. Interchanges and intersections,</p> <p>4. Road pavement designing.</p> <p>5. Bridges.</p> <p>6. Roads Designing based on Polish law.</p> <p>7. City car parks,</p> <p>8. Traffic safety and noise and exhaust fumes protection</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test (road engineering)	51.0%	50.0%
	test (urban engineering)	51.0%	50.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>• Brodecki Z., (red.), 2004, Infrastruktura Acquis Communautaire, Lexis Nexis, Warszawa;</li> <li>• Kicman A., Klepacka B., 1991, Infrastruktura techniczna w planowaniu przestrzennym, Politechnika Białostocka, Białystok</li> <li>• Autostrady i węzły drogowe (prof. R. Krystek)</li> <li>• Inżynieria ruchu drogowego. Teoria i praktyka (Stanisław Gaca, Wojciech Suchorzewski, Marian Tracz)</li> <li>• Budowa dróg - podstawy projektowania (Wiesław Stanisław Młodożeniec)</li> </ul>	
	Supplementary literature	<ul style="list-style-type: none"> <li>• <a href="https://inzynierbudownictwa.pl/">https://inzynierbudownictwa.pl/</a></li> <li>• <a href="https://inzynieria.com/">https://inzynieria.com/</a></li> <li>• <a href="https://strefainzyniera.pl/">https://strefainzyniera.pl/</a></li> <li>• <a href="http://www.polskiinzygnier.pl/">http://www.polskiinzygnier.pl/</a></li> <li>• Mandryas C., Kolonko A., Wysocki L.,: Konstrukcje przewodów kanalizacyjnych Oficyna Wydawnicza Politechniki Wrocławskiej Wrocław 2002 r.</li> <li>• Bolt A., Gudelis-Taraszkiewicz A., Suligowski Z., Tuszyńska A.: Kanalizacja. Projektowanie, wykonanie, eksploatacja "Seidel-Przywecki" sp.z o.o. 2012 r.,</li> <li>• KATALOG TYPOWYCH KONSTRUKCJI NAWIERZCHNIPODATNYCH I PÓLSZTYWNYCH (GDDKiA, Politechnika Gdańska),</li> <li>• Dz.U. 1999 nr 43 poz. 430 Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 2 marca 1999 r. w sprawie warunków technicznych, jakim powinny odpowiadać drogi publiczne i ich usytuowanie</li> </ul>	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<p><b>URBAN ENGINEERING</b> Sample questions during the test:</p> <ul style="list-style-type: none"> <li>• List energy sources - 4 traditional, 4 modern; briefly describe them</li> <li>• Indicate the differences between the sewage and rainwater drainage systems</li> <li>• Describe what the transmission easement is</li> <li>• Give classifications of spatial infrastructure</li> </ul>		
Work placement	Not applicable		