



Subject card

Subject name and code	, PG_00066184						
Field of study	Geodesy and Cartography						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group		Optional subject group		
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							
Name and surname of lecturer (lecturers)	Subject supervisor		Rafał Kaźmierczak				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	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		0.0		0.0	30
Subject objectives	The objective of the course is to familiarize students with selected methods and tools used in geographic information systems (GIS). The main goal of this part of the course is to develop the ability to appropriately apply 3D visualization technologies (AR, VR, MR) and the Microsoft Office suite to solve specific tasks and problems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W05] has a well-established knowledge of analytical methods and surveying techniques necessary for creating and solving a variety of problems in geodesy and cartography		The student possesses well-established knowledge of analytical methods and techniques for processing and visualizing spatial data, including 3D modeling and AR/VR technologies, which can be applied to solving geodetic and cartographic problems.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U06] creates solutions to complex and unstructured problems taking into account the variability of the environment by synthesising information from different sources, using analytical and simulation methods		The student is able to design solutions to complex and unstructured problems in the field of spatial data analysis and visualization by applying 3D technologies (AR, VR, MR), modeling tools, and analytical and simulation software. They can integrate information from various sources and apply it in dynamic spatial and technological contexts.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		

Subject contents	The course covers topics related to the use of modern information technologies, including 3D modeling technologies, spatial analysis, and office productivity tools. The classes aim to familiarize students with tools for spatial data analysis and visualization, the use of augmented and virtual reality, and the implementation of cloud technologies. • Information and its importance definition, types of information, the role of information in the economy. • Cloud work and Microsoft technologies using OneDrive, Microsoft Word, Excel, and PowerPoint for data analysis. • Use of 3D modeling in visualization technologies basic modeling techniques, file formats, and interoperability. • Spatial data visualization application of software for creating dynamic and interactive presentations. • Modern visualization technologies AR, VR, MR and their applications in spatial analysis. • Holographic and anaglyph technologies in 3D visualization. • Virtual tours and interactive visualizations techniques for creating tours similar to Google Street View. • Potential use of AI in spatial data analysis. Practical exercises focus on the hands-on application of tools and technologies discussed in the lectures. Students will work with office software, cloud technologies, augmented reality (AR), virtual reality (VR), and 3D modeling. • Creating and publishing video materials recording and editing educational and analytical content, online publishing. • Creating AR applications designing a mobile application for visualizing land development with a single-family house using AR markers. • VR environments and their applications exploring different types of VR goggles, creating virtual tours and interactive environments. • Mixed reality applications using HoloLens goggles for spatial data analysis and visualization. • Designing virtual tours developing interactive visualizations similar to Google Street View. • Creating 3D visualizations using holographic and anaglyph technologies in spatial presentations. • Basics of 3D modeling creating simple models of spatial objects using available tools.		
Prerequisites and co-requisites	Basic proficiency in creating 3D models.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical tasks	60.0%	100.0%
Recommended reading	Basic literature	1. Badotra, S., Tanwar, S., Rana, A., Sindhwani, N., Kannan, R., Handbook of augmented and virtual reality, Wyd. De Gruyter., R. 2023	
		2. Doerner, R., Broll, W., Grimm, P., Jung, B., Virtual and augmented reality (VR/AR): Foundations and methods of extended realities (XR), Wyd. Springer Nature., R. 2022	
		3. Walkenbach, J., Excel 2013 PL. Biblia. Helion., Wyd. Helion, R. 2013	
	Supplementary literature	1. Gotlib D., Iwaniak A., Olszewski R., GIS obszary zastosowań, Wyd. PWN, R. 2007	
		2. Litwin L., Myrda G., Systemy Informacji Geograficznej. Zarządzanie danymi przestrzennymi w GIS, SIP, SIT, Wyd. Helion, R. 2008	
	eResources addresses	Uzupełniające Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	• Creating a virtual tour of a building based on 360-degree photographs. • Developing an application that visualizes a selected 3D model in augmented reality. • Launching a section of a spatial development plan using VR goggles.		
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.