



Subject card

Subject name and code	Geographic information systems, PG_00045320						
Field of study	Data Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
Education level	first-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	3	Language of instruction			English		
Semester of study	5	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Geoinformatics -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marcin Kulawiak				
	Teachers		dr hab. inż. Marcin Kulawiak				
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		5.0		65.0	100
Subject objectives	Teaching students the basic knowledge and practical skills in the field of Geographic Information Systems and spatial data, which includes both the use of GIS and programming components that implement the basic functions of GIS.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U01] programs in procedural, object, functional and logic programming languages, codes programs at the processor instruction level, runs and tests programs.		The student can program with the use of technologies, tools and libraries for processing spatial data		[SU1] Assessment of task fulfilment		
	[K6_W03] Knows the applications of geoinformation systems, spatial data formats, methods of creating and analysing digital maps, architecture and services of satellite navigation systems.		The Student possesses knowledge about the structure and functionality of GIS and their applications, as well as the sources, models and standard spatial data formats and methods of its processing		[SW1] Assessment of factual knowledge		
Subject contents	Rehersal of the basics of GIS. Map attributes: scale, projection, coordinate system. Types of spatial data. Vector and Raster data formats. Three-dimensional data in GIS. Topological operations. Analysis of the electromagnetic spectrum. Raster data classification. Managing spatial data with Quantum GIS. Georectification of raster data in Quantum GIS. Creating a Web-based GIS in Open Layers. Three-dimensional GIS operations in the web environment using the Cesium library.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Laboratory		60.0%		50.0%		
	Lecture (Exam)		60.0%		50.0%		
Recommended reading	Basic literature		Longley P., Goodchild M., Maguire D., Rhind D. "Geographic Information Systems and Science", John Wiley & Sons Ltd., West Sussex 2005				

	Supplementary literature	S. Shekhar, H. Xiong (ed.), Encyclopedia of GIS. Springer, 2008
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Algorithmic spatial analysis of raster data. 2. Geoprocessing and topological operations on vector data. 3. Building a custom Geographic Information System using computer programming tools. 	
Work placement	Not applicable	