



## Subject card

Subject name and code	Geographic Information Systems, PG_00058935						
Field of study	Informatics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Geoinformatics -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Zbigniew Łubniewski					
	Teachers	dr hab. inż. Marcin Kulawiak dr hab. inż. Zbigniew Łubniewski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	15.0	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		75.0	125	
Subject objectives	Learning by students on basic knowledge and practical skills on Geographical Information Systems (GIS), what includes both using GIS and elements of programming for basic GIS functions implementation.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W42] Knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human cooperation with computers and computer-aided teamwork	Student knows the functionality, architecture and applications of geographic information systems and spatial data models and formats to the extent allowing for using such systems for different tasks as well as for design and implementation of such systems.	[SW1] Assessment of factual knowledge
	[K6_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	Student knows the methods and techniques of geographic information systems programming.	[SW1] Assessment of factual knowledge
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	Student is able to design and to develop an IT solution which implements a given functionality of geographic information system.	[SU1] Assessment of task fulfilment
	[K6_U43] can analyse data and formulate, apply and assess appropriate formal models and algorithms for solving problems in the field of information systems and applications	Student is able to choose and to develop appropriate data models and algorithms in solving problems related to geospatial information processing.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K6_U42] can apply tools and methods of designing, optimization, monitoring, management, increasing reliability and protection from safety hazards in local and distributed information systems and applications	Student is able, applying appropriate methods and tools, to design and optimise geo-IT solutions, also considering the protection against threats.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
Subject contents	1. GIS - definition, concepts, structure and basic terms 2. Examples of GIS applications 3. Data models in GIS 4. Vector data model. Basic vector data types: point, line, polygon. Thematic maps 5. Composed vector data types 6. Raster data model in GIS 7. Vector and raster data formats in GIS 8. Database as a GIS foundation. GIS database types: relational, object-oriented. Specific features of databases used for spatial attributes storage 9. Database queries using spatial attributes of data 10. Standardisation of vector data models. OGC, SQL 11. Topological model of vector data in GIS. Topology rules 12. Three-dimensional data models and representations in GIS 13. GIS data sources and acquiring methods. Import and processing of existing data, geocoding 14. Examples of GIS data measurement techniques 15. Vector data processing algorithms. Geometrical transformations and analysis		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	50.0%	50.0%
	Written exam	50.0%	50.0%
Recommended reading	Basic literature	1. Longley P., Goodchild M., Maguire D., Rhind D. "Geographic Information Systems and Science", John Wiley & Sons Ltd., West Sussex 2005 2. Litwin L., Myrda G. "Systemy Informacji Geograficznej. Zarządzanie danymi przestrzennymi w GIS, SIP, SIT, LIS", Wydawnictwo HELION, Gliwice 2005	
	Supplementary literature	No requirements.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			

Work placement	Not applicable
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