GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Applications of geographic information systems, PG_00045324		
Field of study	Data Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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	6	ECTS credits	3.0
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	18.0	0.0	15.0	12.0	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	4.0	26.0	75

Subject objectives

The aim of the course is to familiarize students with advanced methods of spatial data acquisition, storage, processing, analysis and multidimensional visualization.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] demonstrates professional and effective teamwork, both as a leader and as a team member	As part of group work, the student is able to construct simple data visualizations using GIS libraries.	[SU1] Assessment of task fulfilment
[K6_W02] demonstrates advanced preparation in methods and techniques for formulating and solving problems	Student knows the basics of constructing GIS applications.	[SW3] Assessment of knowledge contained in written work and projects
[K6_K03] demonstrates the ability to think critically and analytically and integrates knowledge from many disciplines in order to make effective decisions	Student can analyse spatial data obtained from various sources.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents

1. Advanced methods of obtaining geospatial data from active and passive sensors.

2. Advanced geospatial data formats and models (data from laser sensors, data from acoustic sensors, data from GPS; GML, KML, GeoJSON, LAS, Shapefile, 3DTiles).
3. Open sources of data acquisition (satellite, aerial, publicly available vector databases).4. Advanced methods of geospatial data processing and analysis (correlation, regression, IDW, Kriging, Minimum Curvature, trend analysis, modeling and simulation of physical phenomena in GIS)

5. Programming of Web-GIS

6. Programming of multidimensional simulations in the context of Spatial Information Systems (3D and 4D modeling and visualization using popular GIS libraries)

Prerequisites and co-requisites

knowledge of the Java, Javascript, C++ and python languages, ability to use Unix/Linux and Windows operating systems,

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
project	60.0%	33.0%
written test	60.0%	34.0%
laboratory	60.0%	33.0%

Recommended reading	Basic literature	Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems*. John Wiley & Sons.
	Supplementary literature	Cressie, N., 1990. The origins of kriging. *Mathematical geology*, *22*(3), pp.239-252.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Methods of raster spatial data acquisition 2. Methods of spatial data analysis	
Work placement	Not applicable	

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