University of Gdańsk

Subject card

Subject name and code	Introduction to geoinformation science - lecture, PG_00135486		
Field of study	Physical geography and geoinformation		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	postgraduate studies	Subject group	Obligatory subject group in the field of study
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	academic	Assessment form	
Conducting unit	Pracownia Systemów Informacji Geograficznej - GIS -> Faculty of Oceanography and Geography		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Maciej Markowski	
	Teachers	dr Maciej Markowski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	15.0	30.0	60

Subject objectives

1. Understanding basic concepts of geoinformatics, characteristics of spatial data, and methods for their modeling and visualization.
2. Acquiring theoretical foundations and skills for describing data locations on the Earth's surface.
3. Familiarization with existing basic spatial digital data for Poland.
4. Understanding principles and methods for presenting work results in the form of maps.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GFGMU2_K01] critical assessment of knowledge in the field of Earth and environmental sciences and geoinformation, its completion and verification through critical analysis of scientific literature	Student is ready for critical assessment, supplementation, and verification of knowledge and skills in geoinformatics through critical review of literature. Contents: A1-A12.	[SK4] test/exam - oral or written
[GFGMU2_U02] precisely and appropriately use terminology in the field of physical geography and geoinformation in oral statements and written works	Student can proficiently and accurately apply terminology related to geoinformatics in written work. Contents: A1-A12.	[SU4] test/exam - oral or written
[GFGMU2_U04] describe and analyze the causes and course of physical and geographical processes and phenomena, selecting and applying advanced techniques and research tools in the field of statistical and geoinformation methods, interpreting the results, using theoretical knowledge to formulate own opinions and conclusions	Student can analyze geospatial data related to physical-geographical phenomena and processes, using appropriate geoinformatic processing tools, and draw relevant conclusions based on them. Program Contents: A1-A12.	[SU4] test/exam - oral or written
[GFGMU2_W05] principles of planning field and laboratory research using techniques and research tools used in geomorphology, hydrology and climatology, as well as principles of operating equipment and devices used to obtain and process digital geographic information in accordance with health and safety principles	Student understands the principles of operating equipment and devices used for acquiring and processing digital geographic information. Contents: A1-A12.	[SW4] test/exam - oral or written
[GFGMU2_W04] theoretical foundations of research methods used in physical geography and closely related sciences, descriptive and mathematical statistics, as well as advanced methods of analyzing spatial phenomena	Student understands advanced methods for analyzing spatial phenomena using GIS tools. Contents: A1-A12.	[SW4] test/exam - oral or written
[GFGMU2_W03] advanced issues in the theory of geographic information systems, basics of organization and operation of spatial information infrastructures and possibilities of using geoinformatics tools in physical geography	Student understands advanced topics in geographic information systems (GIS) theory, basics of organizing and operating spatial information infrastructures, and capabilities of ArcGIS software. Contents: A1-A12.	[SW4] test/exam - oral or written

Subject contents

1. Concept of spatial data, coordinate systems, and projections.
2. Basic concepts of geotechnology, spatial data models, digital maps, principles of data symbolization.
3. Types of data. Acquisition of primary data and their organization. GPS as a tool for acquiring location information.
4. Basic sets of spatial data - Poland. Metadata. Satellite imagery.
5. Spatial data engineering. Attribute data and methods for their processing and analysis.
6. Georeferencing and georectification. Methods for encoding spatial information in raster data. Georeferencing error. Transformation methods.
7. Methods for editing spatial data. Digitization techniques from raster backgrounds.
8. Overview of basic functions (tools) for vector analysis.
9. Introduction to vector modeling methods.
10. Overview of basic functions (tools) for raster analysis.
11. Methods for raster modeling.
12. Interpolation methods for point data and creation of statistical surfaces.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
pass	51.0%	100.0%

Recommended reading	Basic literature	- Davis D., 2004, GIS dla każdego, Wydawnictwo Mikom, Warszawa. - Gotlib D., Iwaniak A., Olszewski R., 2007. GIS. Obszary zastosowań. PWN Warszawa. - Urbański J., 2012, GIS w badaniach przyrodniczych (ebook), Centrum GIS, Uniwersytet Gdański.
	Supplementary literature	- Kryza M., Szymanowski M., Wieczorek M., 2007, The Application of Selected Interpolation Methods for Modelling Extreme Air Temperature in South-Western Poland, Przegląd Geofizyczny, 52(1):61-82. - Lyon J.G., 2003, GIS for water resources and watershed management, CRC Press. - Tomlinson R., Thinking about GIS, 2013, Esri Press.- Zwoliński Z. (red.), 2010, GIS woda w środowisku. Bogucki Wydawnictwo Naukowe, Poznań. - Markowski M., Golus W., Kwidzińska M., 2015, Aplikacyjność metod oceny wielkości opadów zasilających oczka Pomorza Gdańskiego [w:] D. Absalon, M. Matysik, M. Ruman [red.] Nowoczesne metody i rozwiązania w hydrologii i gospodarce wodnej, Komisja Hydrologiczna Polskiego Towarzystwa Geograficznego, Sosnowiec, s. 287-298.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Outline the highlights of the history of GIS.Describe the components and explain how GPS works.Describe the topological vector model.	
Work placement	Not applicable	

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