University of Gdańsk

Subject card

Subject name and code	GIS and Remote Sensing III - laboratory, PG_00204492		
Field of study	Geography		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2028/2029
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Geographic Information System (GIS) Laboratory -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Maciej Markowski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	20.0	0.0	0.0	20

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	20	2.0	28.0	50

Subject objectives

- Familiarization with the capabilities and practical applications of GIS
- Ability to analyze geographic data using GIS
- Presentation of results, map composition, and printing
- Proficiency in GIS software
- Knowledge of analytical methods in processing aerial and satellite images
- Basic skills in remote sensing of the geographic environment
- Ability to conduct remote sensing analyses using ArcGIS/SNAP/QGIS

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GEOGRL3-U04] can apply field and laboratory methods and research tools, spatial analysis methods, and methods of presenting research results in the field of geography, assess their usefulness for tasks in which the application goal of geography can be realized	The student applies spatial analysis methods and data visualization tools to effectively present GIS research results and evaluates their usefulness in addressing spatial problems.	[SU5] implementation of a problem task
[GEOGRL3-W06] knows advanced methods of acquiring, processing, and compiling geographic environmental data, as well as methods of analyzing and interpreting such data	The student independently acquires, processes, and analyzes spatial data in a GIS environment, creating databases using both spatial and non-spatial data and applying various metadata formats.	[SW4] test/exam - oral or written
[GEOGRL3-K02] is prepared to bear full responsibility for the actions taken actions and adhere to the principles of professional ethics and principles of intellectual honesty, is aware of the importance of a professional approach in professional life professional life	The student ensures the transparency of the research process by documenting data sources and methodology (metadata), thereby guaranteeing the reproducibility and integrity of the presented cartographic results.	[SK5] implementation of a problem task
[GEOGRL3-U03] can plan and conduct, independently and as part of a team, simple research in the field of geography under the supervision of a scientific advisor, based on the necessary information from professional literature and other sources	The student can plan and conduct GIS analyses based on diverse spatial data sources, both individually and collaboratively in a team.	[SU5] implementation of a problem task

Subject contents

B.12 Discussion and utilization of vector and raster analysis functions
B.13 Methods for delineating watersheds and streams based on DEM
B.14 Modeling the volume of water bodies and earthworks
B.15 Traditional techniques of remote sensing analysis
B.16 Sources and characteristics of remote sensing imagery
B.17 Color composites in the interpretation of satellite imagery
B.18 Spectral indices in environmental remote sensing analysis

Prerequisites and co-requisites

Completion of the course GIS and Remote Sensing II

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
practical and theoretical exercises	51.0%	60.0%
test	51.0%	40.0%

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.
- Sitek Z., 1997. Wprowadzenie do teledetekcji lotniczej i satelitarnej, Wydawnictwa AGH, Kraków.
- Adamczyk J., Będkowski K, 2007. Metody cyfrowe w teledetekcji. Wydawnictwo SGGW.
- Kurczyński Z., 2006. Lotnicze i satelitarne obrazowanie Ziemi, Oficyna wydawnicza Politechniki Warszawskiej, Warszawa
- 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.

	Supplementary literature	• Richards J.A., Jia X., 2006. Remote sensing digital image analysis. Springer. • Butowtt J., Kaczyński R., 2003, Fotogrametria, Wojskowa Akademia Techniczna, Warszawa. • 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. • Bajkiewicz-Grabowska E., Markowski M., Lemańczyk K., 2016, Application of geoinformation techniques to determine zones of sediment resuspension induced by wind waves in lakes (using two lakes from Northern Poland as examples), Limnological Review 1/2016.
	eResources addresses	
Example issues/ example questions/ tasks being completed	• What are the basic differences between vector and raster analysis, and in what situations is each of them used? • How can watersheds and stream networks be delineated based on a Digital Elevation Model (DEM)? • What are spectral indices, and how are they used in the analysis of satellite imagery?	
Work placement	Not applicable	

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