



Transitional work on geoscience in environmental management –
individually selected issue solved under the supervision of a tutor
Course description sheet

Basic information

Field of study Remote Sensing and Geo Informatics	Didactic cycle 2026/2027	
Major All	Course code DRSGIS.II4.15501.26	
Organisational unit Faculty of Geo-Data Science, Geodesy, and Environmental Engineering	Lecture languages English	
Study level Second-cycle studies	Mandatoriness Obligatory	
Form of study Full-time studies	Block Core Modules	
Profile General academic	Course related to scientific research Yes	
Course coordinator	Ewa Głowienka	
Lecturer	Beata Hejmanowska, Urszula Marmol, Wojciech Drzewiecki, Natalia Borowiec, Tomasz Pirowski, Antoni Rzonca, Mariusz Twardowski	
Period Semester 3	Method of verification of the learning outcomes Exam	Number of ECTS credits 6
	Activities and hours Control and transitional thesis: 80	

Goals

C1	This module deals with the transitional work on geoscience in environmental management
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge - Student knows and understands:			
W1	methods and algorithms and their theoretical basis for transitional work on geoscience in environmental management	RSGI2A_W01, RSGI2A_W02, RSGI2A_W03, RSGI2A_W04, RSGI2A_W05	Participation in a discussion, Examination, Report, Case study, Involvement in teamwork, Preparation and conduct of scientific research
W2	advanced knowledge of applied geoscience for environmental monitoring and management	RSGI2A_W03, RSGI2A_W04, RSGI2A_W05, RSGI2A_W06, RSGI2A_W07	Participation in a discussion, Examination, Report, Case study, Involvement in teamwork, Preparation and conduct of scientific research
Skills - Student can:			
U1	perform advanced spatial analysis using remote sensing data for natural hazards and disaster risk reduction	RSGI2A_U01, RSGI2A_U02, RSGI2A_U03, RSGI2A_U04, RSGI2A_U05	Participation in a discussion, Report, Case study, Involvement in teamwork, Preparation and conduct of scientific research
U2	perform advanced spatial analysis using remote sensing data in urban planning and environmental management	RSGI2A_U02, RSGI2A_U03, RSGI2A_U04, RSGI2A_U05	Participation in a discussion, Examination, Report, Case study, Involvement in teamwork, Preparation and conduct of scientific research
Social competences - Student is ready to:			
K1	responsible use of process data in the field of transitional work on geoscience in environmental management in practice, while being aware of their capabilities and limitations	RSGI2A_K01, RSGI2A_K02, RSGI2A_K03	Participation in a discussion, Report, Case study, Involvement in teamwork, Preparation and conduct of scientific research

Program content ensuring the achievement of the learning outcomes prescribed to the module

The student will acquire advanced knowledge of geoscience in environmental management . The student chooses an individual project from the available selection of topics or proposes his/her own topic. This module is fully elective in terms of both the subject matter and the instructor.

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Control and transitional thesis	80

Realization of independently performed tasks	30
Contact hours	5
Preparation of project, presentation, essay, report	30
Preparation for classes	30
Examination or final test/colloquium	2
Student workload	Hours 177
Workload involving teacher	Hours 80

* hour means 45 minutes

Program content

No.	Program content	Course's learning outcomes	Activities
1.	<p>Within the block of classes, the student practically applies knowledge and skills from two modules completed in the first part of the semester: Natural Hazards and Disaster Risk Reduction and Urban Planning and Environmental Management. The student chooses an individual project from the available selection of topics or proposes his/her own topic. Within the lecture part, the student is introduced to the knowledge of the performed topics. He or she learns the characteristics of scientific research: conducting a literature review, critical analysis, defining the research problem, making a hypothesis, planning an experiment, conducting and documenting the research developing a report. The workshop part consists of performing comprehensive work to solve the selected problem. The work includes advanced exploratory data analysis on different tools and programs, the concepts of training, test and validation sets. During the workshop, the student consults the results of his research with the supervisor. The class ends with the defense of the interim work at the exam.</p> <p>An introduction to transitional work on geoscience in environmental management. Basic exploratory data analysis on different tools and programs. The concepts of training, test and validation sets. Transitional work on geoscience in environmental management tools in sample projects.</p>	W1, W2, U1, U2, K1	Control and transitional thesis

Extended information/Additional elements

Teaching methods and techniques :

Discussion, E-learning, Case study, Group work, Design thinking, Problem Based Learning, Mentoring, Workshop

Activities	Methods of verification	Credit conditions
Control and transitional thesis	Participation in a discussion, Examination, Report, Case study, Involvement in teamwork, Preparation and conduct of scientific research	Verification of the knowledge during the exam as part of the transitional work passing. Workshops are mandatory. Credit is based on student's activity.

Conditions and the manner of completing each form of classes, including the rules of making retakes, as well as the conditions for admission to the exam

Credit of the workshop - on the basis of attendance at classes. A student may proceed to a resit twice.

Method of determining the final grade

Final grade = average of exam and workshop assignments.

Manner and mode of making up for the backlog caused by a student justified absence from classes

Compensating for the backlog caused by absence: depending on the classes subject - self-realisation of exercises with the help of individual consultations with the instructor.

Prerequisites and additional requirements

Basic knowledge of mathematics

Rules of participation in given classes, indicating whether student presence at the lecture is obligatory

Classes in the semester are conducted in blocks. Transitional work is preceded by blocks: Natural Hazards and Disaster Risk Reduction and Urban Planning and Environmental Management.

Workshops include the training of practical application of the knowledge and is compulsory.

Literature

Obligatory

1. Głowienka E., Jankowicz B., Kwoczyńska B., Kuras P., Michałowska K., Mikrut S., Moskal A., Piech I., Strach M., Sroka J.: Photogrammetry and laser scanning in 3D modeling. 2015. Scientific editors: Mikrut S. and Głowienka E. Publisher: University of Engineering and Economics,
2. James G, Witten D, Hastie T, Tibshirani R: An introduction to statistical learning (second edition) (ISBN: 978-1-0716-1417-4, freely available online at <https://www.statlearning.com>)

Optional

1. Borkowski A., Głowienka E., Hejmanowska B., Kwiatkowska-Malina J., Kwolek M., Michałowska K., Mikrut S., Pękała A., Pirowski T., Zabrzaska-Gąsiorek B.: GIS and remote sensing in environmental monitoring. 2015. Collective work edited by dr inż. E. Głowienki. WSIE Publishing House, Rzeszów 2015.
2. Bęcek K., Gawronek P., Kwoczyńska B., Matuła P., Michałowska K., Mikrut S., Mitka B., Piech I., Makuch M. Modelling and visualisation of 3D data from photogrammetric measurements and laser scanning. 2015. Scientific editorship by Dr Eng. K. Michałowska, WSIE Publishers, Rzeszów 2015. ISBN 978-83-60507-29-2, 104 pages.

Scientific research and publications

Research

1. "Automated system of precise volumetric measurements - VolumeMonit" - NCBiR POIR.04.01.04

Publications

1. Mikrut S., Kohut P., Pyka K., Tokarczyk R., Barszcz T., Uhl T. : Mobile Laser Scanning Systems for Measuring the Clearance Gauge of Railways: State of Play, Testing and Outlook. *Sensors* 2016, 16(5), 683; (doi:10.3390/s16050683)

Learning outcomes prescribed to a field of study

Code	Content
RSGI2A_K01	is ready to resolve conflicts, negotiate, work in a team
RSGI2A_K02	is ready for creative time management, working under time pressure
RSGI2A_K03	maintain an ethical attitude while performing and presenting the results of assigned tasks
RSGI2A_U01	can apply knowledge of mathematics and physics to analyze geospatial data
RSGI2A_U02	can acquire remote environmental data
RSGI2A_U03	is able to process geospatial data and automate data processing in an advanced manner
RSGI2A_U04	is able to use IT tools for spatial data processing
RSGI2A_U05	can work both individually and in teams; can prepare a proposal for a research project
RSGI2A_W01	has a deep knowledge of mathematics in remote sensing data analysis
RSGI2A_W02	has an enhanced knowledge of physics necessary to understand the interaction of electromagnetic radiation in the atmosphere and with the Earth's surface
RSGI2A_W03	has a deep understanding of remote environmental data acquisition methods
RSGI2A_W04	has a deep understanding of methods, algorithms and automation of spatial data processing
RSGI2A_W05	has an enhanced knowledge of the use of computer science in geoscience
RSGI2A_W06	knows selected social, economic and legal aspects of the geo-information society
RSGI2A_W07	knows the basic concepts and principles of intellectual property protection, copyright and patent information resources