Applications of GIS

Educational subject description sheet

Basic information

Field of study Environmental Protection and Management **Speciality** - **Department** Faculty of Biology **Study level** second cycle **Study form** full-time degree programme **Education profile** General academic **Mandatory** obligatory	**Education cycle** 2021/22 **Subject code** UJ.WBIEPMS.220.5cac67bb75298.21 **Lecture languages** English **Subject related to scientific research** Yes **Disciplines** Biological sciences **ISCED classification** 0511 Biology **USOS code**

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Lecturer	Elżbieta Ziółkowska, Jacek Kozak

Period Semester 2	**Examination** exam **Activities and hours** lecture: 10, classes: 30, field classes: 5	**Number of ECTS points** 4.0

Goals

C1	przekazanie podstawowej wiedzy i umiejętności w dziedzinie informacji geograficznej i jej zastosowań środowiskowych

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	a student knows basic theory in geographic information science and technology (GIS&T) including basics of cartography, remote sensing and geographic information systems (GIS), student knows basic properties and sources of spatial data, student knows basic principles of spatial data infrastructure	EPM_K2_W08	Final quiz, project
Skills – Student can:			
U1	a student is able to work with GIS software	EPM_K2_U02	Final quiz, project
U2	a student can apply selected methods of spatial data processing and analysis, to search for spatial data, to assess their quality and usefulness, to apply them to solve practical problems in environmental protection and management and to visualize results as a map	EPM_K2_U02	Final quiz, project
Social competences – Student is ready to:			
K1	a student is aware of legal restrictions in spatial data use and licensed software use, as well as of importance of legal regulations in spatial data use	EPM_K2_K01, EPM_K2_K07	project
K2	a student strictly follows the workplace health and safety rules in the computer labs and during field work	EPM_K2_K03	project

Calculation of ECTS points

Activity form	Activity hours*
lecture	10
classes	30
field classes	5
preparation for exercises	15
preparation for final test	20
preparation of a project	20

Student workload	**Hours** 100	**ECTS** 4.0
Workload involving teacher	**Hours** 45	**ECTS** 1.7
Practical workload	**Hours** 5	**ECTS** 0.2

* hour means 45 minutes

Study content

No.	Course content	Subject's learning outcomes
1.	Representations in geography, spatial data models and structures, spatial reference systems, spatial data acquisition, spatial data quality, spatial data infrastructure. An introduction to the ArcMap user interface and feature representations, vector and raster model, spatial databases, GIS data management, exploring GIS data from different sources, understanding spatial reference systems, introduction to spatial analysis (spatial and attribute queries, map algebra, global, zonal, focal and local operations and functions), distance and density based analysis, spatial interpolation, data visualization, introduction to symbology and cartography, case studies on using GIS in environmental protection & management. Interpreting maps and aerial photos in the field – comparison and verification of content, basic techniques of field measurements, basics of satellite navigation.	W1, U1, U2, K1, K2

Course advanced

Teaching methods:

project method, lecture, laboratories

Activities	Examination methods	Credit conditions
lecture		brak
classes	Final quiz	Warunek dopuszczenia: 80% obecności na ćwiczeniach. Kolokwium końcowe - zaliczenie wymaga osiągnięcia poziomu 60% całego zasobu wiedzy i umiejętności (wykład i ćwiczenia)
field classes	project	Projekt realizowany w grupie, wraz z prezentacją. Wymagane jest osiągnięcie wiedzy i umiejętności w wysokości 60% całego zasobu wiedzy i umiejętności; wykazanie w 100% zakładanych kompetencji personalnych i społecznych.

Entry requirements

None

Literature

Obligatory

1. Longley P.A., Goodchild M.F., Maguire D.J., Rhind D.W., 2010, Geographic Information Systems and Science. John Wiley&Sons

Optional

1. Wybrane publikacje podawane w czasie wykładów i ćwiczeń

Effects

Code	Content
EPM_K2_W08	The graduate knows and understands the rules of analyzing empirical data, research results and their interpretation, as well as the rules of predicting the course of biological phenomena and processes while using relevant mathematical, statistical and computational methods
EPM_K2_U02	The graduate is able to use appropriate statistical tools and software to collect and interpret data
EPM_K2_K01	The graduate is able to critically appraise acquired information, use reliable and well-established sources of scientific information and draw appropriate conclusions when settling practical problems
EPM_K2_K07	The graduate is able to identify and settle dilemmas related to his work following the rules of ethics and legal requirements
EPM_K2_K03	The graduate is able to take responsibility for an appropriate evaluation of job risks and take care of safety and ergonomics while completing various tasks