University of Silesia in Katowice

1.	Field of study	Geography
2.	Faculty	Faculty of Natural Sciences
3.	Academic year of entry	2020/2021 (winter term), 2021/2022 (winter term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

Module: GIS in Geology

Module code: 04-GF-S2-1103

1. Number of the ECTS credits: 3

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
04-GF-S2-1103_1	understand the background and methodology of several GIS techniques used in geology	KGG2_K01 KGG2_U04 KGG2_W01 KGG2_W02	2 2 2 4
04-GF-S2-1103_2	has practical skills in using GIS tools in analysis, visualization and interpretation of geological data	KGG2_U01 KGG2_U03 KGG2_U04 KGG2_W02	4 4 2 3
04-GF-S2-1103_3	know how to acquire data and process digital elevation models of various scales, conduct morphometric and morphotectonic analyses, and conclude on the geological causes of obtained pattern; know how to use GIS methods based on DEM in geohazard studies	KGG2_K01 KGG2_K02 KGG2_U01 KGG2_U03 KGG2_U04 KGG2_W02	1 2 4 4 2 3
04-GF-S2-1103_4	understand the fundaments of „Structure from Motion" technique, know how to use it	KGG2_K02 KGG2_U01 KGG2_U04	2 4 2
04-GF-S2-1103	is familiar with GIS techniques applied in geological mapping, and can use them in practice, and understand the basic of this	KGG2_U01	2

_5	specific type of cartography	KGG2_U04	2
		KGG2_W01	2
		KGG2_W02	4

3. Module description

| Description | The main aim of the module GIS in Geology is to familiarize students with the geological applications of selected remote sensing and GIS techniques. Module includes theoretical introduction into the geological cartography, encompassing various types of geological maps. The course will allow students to understand the background and methodology of several techniques used in geology and based on GIS tools. The course will focus mainly on the practical usage of introduced techniques using GIS software and the interpretation of obtained results. The most important methods introduced during the course include morphometric analysis of Digital Elevation Models in various scales (hydrological tools, analysis and tectonic interpretation of drainage system, calculation of selected morphometric indices used in active tectonic studies, etc.), lineaments analysis (i.e. hillshade, slope, aspect, direction analysis, contour maps with dense isolines), Structure from Motion and its usage in geological studies, terrestrial laser scanning, landslide inventory and susceptibility mapping. |
| Prerequisites | |

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
04-GF-S2-1103_w_1	Written test	Verification of knowledge acquired by the student during lectures and individual reading of the indicated literature	04-GF-S2-1103_1, 04-GF-S2-1103_5
04-GF-S2-1103_w_2	Evaluation of projects prepared during classes	Verification of student GIS skills and geological interpretation of obtained results acquired during the course, based on evaluation of projects prepared during laboratory classes	04-GF-S2-1103_2, 04-GF-S2-1103_3, 04-GF-S2-1103_4, 04-GF-S2-1103_5

5. Forms of teaching

code	form of teaching			required hours of student's own work		assessment of the learning outcomes of the module
	type	description (including teaching methods)	number of hours	description	number of hours	
04-GF-S2-1103_fs_1	lecture	Lectures presenting GIS methods used in the analysis, visualization and interpretation of geological data	10	individual acquisition of knowledge of geological processes; reading of the indicated literature; student consultations	15	04-GF-S2-1103_w_1
04-GF-S2-1103_fs_2	laboratory classes	Performing by the student the assigned laboratory projects (cartographic, statistical, modeling) using GIS software along with the analysis of the obtained results and their visualization.	30	preparation for the laboratory classes by familiarizing with the indicated issues, working out results from the laboratory, getting acquainted with Polish and foreign literature and software environment	20	04-GF-S2-1103_w_2