

## **COURSE/MODULE SYLLABUS FOR UNIVERSITY COURSES/PhD STUDIES**

1.	Course/module name in Polish and English Geohazards/ Geozagrozenia
2.	Discipline Earth and Environmental Science
3.	Language of instruction English
4.	Teaching unit Faculty of Earth Science and Environmental Management, Institute of Geological Sciences, Department of Structural Geology and Geological Mapping
5.	Course/module code USOS
6.	Type of course/module ( <i>mandatory or optional</i> ) optional
7.	Field of studies (major, if applicable) Geology
8.	Level of higher education ( <i>undergraduate (I cycle), Master's (II cycle), 5 year uniform Master's studies</i> ) Master's (II cycle)
9.	Year of studies ( <i>if applicable</i> ) I/II
10.	Semester ( <i>winter or summer</i> ) winter/summer
11.	Form of classes and number of hours Lectures: 16 Field classes: 12 preparation of reports
12.	Name, title/degree of the teacher/instructor Coordinator: dr hab. Jurand Wojewoda Lecturer: dr hab. Jurand Wojewoda
13.	Course/module prerequisites, in terms of knowledge, skills, social competences General knowledge in the field of physical geology, tectonics, sedimentology, hydrology and geomorphology
14.	Course objectives Obtaining knowledge about the methodology of categorizing processes and phenomena, stochastic and phenomenological categorization of natural events and events, and ways of describing them; the ability to predict geohazards based on available premises;

	<p>familiarization with methods of risk prevention or conversion; review of engineering and organizational practices in geohazard situations.</p> <p>The lectures are aimed at familiarizing students with the most important geohazards of their consequences, both on the geological and historical scale, as well as on the scale of currently occurring processes. Discussion aimed at acquainting students with selected cases of catastrophic (disaster) geosciences in terms of: causes, consequences and preventive actions.</p>	
15.	<p>Course content</p> <p>Lectures:</p> <p>Introduction (processes, phenomena and events - physical, stochastic, phenomenological and social categorization). Earth (planetary geohazards - endogenous, exogenous), (space and socio-economic - classification, identification and selection of methods of description). The main ways of modeling geohazards (selection of model for technical feasibility, scope and use of prediction). Geodynamic hazards (seismic activity - earthquakes, causes, history, monitoring, effects and prevention of the effects). Active fault zones - location, kinematic characteristics, the geological and engineering effects and prevention). Tsunami (history, causes, physics of the trigger process and tsunami monitoring, effects and prevention). Geotechnical hazards (landslides - creeping, rock falls, slumps and mass flows) - physics of the processes and trigger mechanisms, monitoring, and prevention of the effects of legal and social aspects). Hydrological hazards (storm rain floods, mass movements and slope erosion, including soil erosion, effects, prevention, river's valleys floods and their causes, flood wave, monitoring systems, methods of flood protection (static and dynamic retention, stimulating the flood wave, water management in the drainage basin), storm surges, causes, effects and prevention, coastal lithodynamics and coastal erosion). Karst features and associated hazards (rocks karstification processes and their effects, hazards and disasters in karst areas). Mining hazards (modes of exploitation and the self-, and forced dynamics, subsidence, collapses, eruptions, land subsidence, mining damages, submergence of the areas, impact).</p> <p>Field classes:</p> <p>Familiarizing students with the Wrocław flood defense system</p>	
16.	<p>Intended learning outcomes</p> <p>W_1 The student has knowledge about the most important possible natural and anthropopressal threats related to the broadly understood geological environment (underground, land, soil, slopes, volcanoes, coastlines, glaciers, etc.). Threats are dealt with by (1) recognizing the nature of the natural process (permanent, changeable (cyclical, evolutionary), event and (2) its consequences (phenomena, effects, implications). The student acquires knowledge in the field of modeling processes and phenomena, that is, an adequate description of processes and phenomena, and ways to find the right and possible models.</p> <p>W_2 The student knows how to use models and predictions of geohazards. During the course, particular attention is paid to the</p>	<p>Symbols of learning outcomes for particular fields of studies:</p> <p>K2_W01, K2_W03, K2_W04, K2_W05, K2_W07, K2_W09, K2_W010</p> <p>K2_W01, K2_W03, K2_W04, K2_W05, K2_W07, K2_W09, K2_W010</p>

	<p>social and economic aspects of geohazards, as well as the methods and costs of collateral (eg. geodynamics, seismicity, landslides, ground subsidence, flooding areas with water).</p> <p>W_3 The student knows the global monitoring and protection systems: anti-earthflow and flood control.</p> <p>W_4 The student knows the legal and organizational rules applicable in Poland in the above-mentioned field.</p>	<p>K2_W01, K2_W03, K2_W04, K2_W05,</p> <p>K2_W07, K2_W09, K2_W010</p>
17.	Required and recommended reading ( <i>sources, studies, manuals, etc.</i> )	
	<p>Required reading</p> <p>Keller, E.A., Blodget, R.H., 2008. Natural Hazards – Earth’s Processes as Hazards, Disasters, and Catastrophes. Pearson Prentice Hall, 488 pp.</p> <p>Keller, E.A., 1999. Introduction to Environmental Geology. Pearson Prentice Hall, 383 p.</p> <p>Maund, J. G., Eddleston, M., 1998. Geohazards in Engineering Geology. Geological Society Publ. House, 448 pp.</p> <p>Recommended reading</p> <p>Graniczny, M., Mizerski, W., 2007. Katastrofy Przyrodnicze. Wydawnictwo Naukowe PWN, 198 pp.</p> <p>Coch, N.E., 1995. Geohazards: Natural and Human. Prentice-Hall, Englewood Cliffs, 481 pp.</p> <p>Zilinga de Boer, J., Sanders, D.T., 2005. Earthquakes in Human History. Princeton University Press, 278 pp.</p> <p>Graniczny, M., Mizerski, W., 2007. Katastrofy Przyrodnicze. Wydawnictwo Naukowe PWN, 198 pp.</p> <p>Wojewoda, J., 2013. Geohazards. <a href="http://www.jw.ing.uni.wroc.pl/">http://www.jw.ing.uni.wroc.pl/</a></p>	
18.	Assessment methods for the intended learning outcomes: - writing a class report: K2_W01, K2_W03, K2_W04, K2_W05, K2_W07, K2_W09, K2_W010.	
19.	Credit requirements for individual components of the course/module: - lectures and field course: writing a class report	
20.	Total student effort	
	form of student activities	number of hours for the implementation of activities
	classes (according to the plan of studies) with a teacher/instructor: - lectures: 16 - field classes: 12	28
	student's own work (including group-work) such as: - being prepared for classes: 8 - reading the suggested literature: 10 - writing a class report: 10	28
	Total number of hours	56
	Number of ECTS credits	2