

Level: bachelor				
Course title: Physics of the lithosphere				
Status: elective				
ECTS: 6				
Requirements:				
Learning objectives Introduce students to the basic structure and elemental internal movements in the lithosphere. Connecting structure of rocks with water movement processes in the crust. Introduction and modelling of thermal processes at the border lithosphere-atmosphere.				
Learning outcomes Upon completion of the course, students should have developed: - General skills: following professional literature; ability to analyse and select the most appropriate solutions. Mastering the basic techniques of modelling of physical processes using matrix calculus. - Subject-specific skills: understanding the specific terminology. Understanding the basic laws of motion of matter inside the Earth and phenomena that are its consequences. Knowing the elemental composition of the Earth's crust and water movement in the lithosphere.				
Syllabus <i>Theoretical instruction</i> Evolution, internal structure and dynamics of the Earth. The structure, composition and dynamics of Earth's shell. Lithosphere-basics and definitions. Physical and crystallographic properties of minerals. The systematization of minerals-aluminosilicates. The formation and movement of magma. Bowen crystallization series of forming igneous rocks. The classification of rocks. Morphology. The physical characteristics of different types of rocks. Heat balance of rocky surface. The active surface. Radiation balance on the rocky surface. Thermo-physical properties of rocks. Heating and cooling of the air. Daily and annual fluctuation of temperature on the rocky surface. Heat transport and temperature changes in deeper layers (seismic model). Groundwater. The dynamics of water movement in lithosphere. Influence of water presence on the heat transport in the crust. Process modelling on a rocky surface. Rocks as a boundary surfaces in the models for numerical weather prediction. The influence of rocky surface on the physical processes in the surface layer of the atmosphere. The processes in the atmosphere as a result of contact between rocky and large water surfaces. Parameterization of the processes on a rocky surface. Scheme for parameterization of surface processes involving the rocky surface. <i>Practical instruction</i> Experimental exercises that follow the course content. Solving the given problem by using the appropriate computational models.				
Weekly teaching load				Other:
Lectures: 3	Exercises: 1	Other forms of teaching: 1	Student research:	