Faculty of Civil Engineering and Environmental Sciences									
Field of study	Degree le				Degree level and programme type	BSc.			
Specialization/ diploma path								Study profile	academic profile
Course name	Engineering geology and petrography						Course code	IS-FCEE-00150S	
								Course type	Erasmus
Forms and	L	С	LC	Р	SW	FW	S	Semester	Summer
number of hours of tuition	30				15			No. of ECTS credits	3
Entry requirements	does not concern								
Course objectives	The aim of the course is to teach students the necessary knowledge of geology and geomorphology, including the presentation of various geological processes that shape the terrain and affect its properties relevant to civil engineers. The course also aims to teach students practical recognition of rocks and basic information about rocks and their origins.								
Course content	<ul> <li>students practical recognition of rocks and basic information about rocks and their origins.</li> <li>Lecture: The importance of geology in construction issues. Earth's interior. Earthquakes. The impacts of earthquakes, minimizing damage and casualties. Fundamentals of plate tectonics. Mountain building. Volcanoes and other igneous activity (types of volcanoes, volcanic hazards, intrusive igneous bodies). Extrusive and intrusive igneous rocks. Metamorphism and metamorphic rocks. Weathering and soil (mechanical weathering, chemical weathering, the products of weathering and erosion). Mass wasting (classification of mass wasting, preventing, delaying, monitoring, and mitigating mass wasting). Stream erosion and deposition. Glaciation (glaciers, glacial erosion, glacial deposition). Deserts and wind. Sediments and sedimentary rocks (clastic, chemical and organic sedimentary rocks). Geological structures (folding, fracturing and faulting). Groundwater (aquifers, groundwater flow, groundwater quality). Shorelines (coastal erosion and coastal deposition).</li> <li>Specialized workshop: Basic terms related to crystallography, mineralogy and petrography. Mineral properties - practical recognition. Mohs scale. The common rockforming minerals. Rock, the rock cycle, classification of rocks. Minerals of igneous rocks, macroscopic recognition. Igneous rocks (extrusive and intrusive igneous rocks), mineral composition, classification, recognition. Minerals in the sedimentary cover. Sediments and sedimentary rocks (clastic, chemical and organic sedimentary rocks). Carbonate rocks. Metamorphic minerals and rocks. Industrial uses of rocks.</li> </ul>								
Teaching methods	Informative lecture, specialization workshop.								

## COURSE DESCRIPTION CARD

LO1Student has knowledge of rocks and processes leading to rocks transformation, knows their genesis.K_B1_W01LO2Student is able to describe the geological processes that formed the area and which affect its properties.K_B1_W01, K_B1_U01LO3Student is able to use his knowledge to better understand issues of building materials, soil mechanics and foundation.K_B1_W01LO4Student is ready to find the relationship between geology and engineering object.K_B1_K01LO5Student can recognize rocks and minerals.K_B1_U01LO6Student knows the basic terms in the field of stratigraphy and lithology.K_B1_W01L07Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.K_B1_K01 K_B1_K02 K_B1_K06Symbol ofType of tuition during	Assessment	Lecture: final test					
L01       transformation, knows their genesis.       K_BW01         L02       Student is able to describe the geological processes that formed the area and which affect its properties.       K_BW01, K_BU01         L03       Student is able to use his knowledge to better understand issues of building materials, soil mechanics and foundation.       K_BW01         L04       Student is ready to find the relationship between geology and engineering object.       K_BU01         L05       Student is ready to find the relationship between geology and ithology.       K_BU01         L06       Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.       K_BU01         L07       Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.       Type of tuition during which the outcome is assessed         L01       final test, written test       L,SW         L02       final test, written test       L,SW         L03       final test, written test       L,SW         L04       final test, written test       L,SW         L05       written test       SW         L06       final test       L         L03       participation in lectures       30         participation in special	Symbol of learning		Reference to the				
LO2         Student is able to describe the geological processes that formed the area and which affect its properties.         K_B1_W01, K_B1_U01           LO3         Student is able to use his knowledge to better understand issues of building materials, soil mechanics and foundation.         K_B1_W01           LO4         Student is ready to find the relationship between geology and engineering object.         K_B1_W01           LO5         Student can recognize rocks and minerals.         K_B1_W01           LO6         Student knows the basic terms in the field of stratigraphy and lithology.         K_B1_W01           LO7         Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.         Type of tuition during which the outcome is assessed           Symbol of learning outcome         Methods of assessing the learning outcomes         Type of tuition during which the outcome is assessed           LO3         final test, written test         L           LO3         final test, written test         L           LO3         final test         L           LO3         final test         L           LO3         final test, written test         L           LO3         final test         L           LO4         final test         L           LO5         written test	L01	•	K_B1_W01				
LO3         Student is able to use his knowledge to better understand issues of building materials, soil mechanics and foundation.         K_B1_W01           LO4         Student is ready to find the relationship between geology and engineering object.         K_B1_U01           LO5         Student can recognize rocks and minerals.         K_B1_U01           LO6         Student knows the basic terms in the field of stratigraphy and lithology.         K_B1_U12           LO7         Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.         Type of tuition during which the outcome is assessed           Symbol of learning outcome         Methods of assessing the learning outcomes         Type of tuition during which the outcome is assessed           LO2         final test, written test         L, SW           LO2         final test, written test         L, SW           LO2         final test         L           LO3         final test         L           LO4         final test         L           LO3         final test         L           LO4         final test         L           LO4         final test         L           LO5         written test         SW           LO6 <thinal test<="" th="">         L      <tr< td=""><td>LO2</td><td>Student is able to describe the geological processes that</td><td colspan="2"></td></tr<></thinal>	LO2	Student is able to describe the geological processes that					
LO4         Student is ready to find the relationship between geology and engineering object.         K_B1_K01           LO5         Student can recognize rocks and minerals.         K_B1_U01 K_B1_U05           LO6         Student knows the basic terms in the field of stratigraphy and lithology.         K_B1_W01           LO7         Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.         K_B1_K02 K_B1_K06           Symbol of learning outcome         Methods of assessing the learning outcomes         Type of tuition during which the outcome is assessed           LO2         final test, written test         L, SW           LO3         methods of assessing the learning outcomes         Type of tuition during which the outcome is assessed           LO3         final test, written test         L, SW           LO4         final test, written test         L, SW           LO4         final test         L           LO5         written test         SW           LO6         final test         L           LO7         written test         SW           LO6         final test         L           LO6         final test         SW           LO6         final test         SW           preparation for pas	LO3	Student is able to use his knowledge to better understand					
LOS       Student can recognize rocks and minerals.       K_B1_U05         LO6       Student knows the basic terms in the field of stratigraphy and lithology.       K_B1_U12         LO7       Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.       K_B1_K01         Symbol of learning outcome       Methods of assessing the learning outcomes       Type of tuition during which the outcome is assessed         LO1       final test, written test       L, SW         LO2       final test, written test       L, SW         LO3       final test, written test       L, SW         LO4       final test       L         LO3       final test       L       SW         LO4       final test       L       SW         LO6       final test       SW       SW         LO6       final test       SW       SW         LO6       final test       SW       SW         Calculation       participation in lectures       30       preparation for passing the specialization workshop	LO4	Student is ready to find the relationship between geology and	K_B1_K01				
LO6     Iithology.     K_B1_W01       LO7     Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.     K_B1_K01       Symbol of learning outcome     Methods of assessing the learning outcomes outcome     Type of tuition during which the outcome is assessed       LO1     final test, written test     L, SW       LO2     final test, written test     L, SW       LO3     final test, written test     L, SW       LO4     final test     L       LO5     written test     SW       LO6     final test     L       LO7     written test     SW       LO6     final test     L       participation in lectures     30       preparation for passing the lecture     5       preparation for passing the lecture     5       preparation for passing the lecture     5       preparation for passing the specialization workshop     5       preparation for passing the specialization workshop     5	LO5						
LO7     Student is ready to critically assess the knowledge, use expert opinions and the need for continuous deepening of knowledge in the field of engineering geology.     K_B1_K02 K_B1_K02 K_B1_K02 K_B1_K02       Symbol of learning outcome     Methods of assessing the learning outcomes outcome     Type of tuition during which the outcome is assessed       LO1     final test, written test     L, SW       LO2     final test, written test     L, SW       LO3     final test, written test     L, SW       LO4     final test     L       LO5     written test     SW       LO6     final test     L       LO7     written test     SW       LO6     final test     L       LO7     written test     SW       LO6     final test     L       participation in lectures     30       participation in specialization workshop     15       preparation for specialization workshop     5       preparation for passing the lecture     5       preparation for passing the specialization workshop     5       Verticipation in consultations for specialization workshop     5       preparation for passing the specialization workshop     5       frequentiative indicators     HOURS     Ko. of ECTS credits	LO6		K_B1_W01				
learning outcome     Methods of assessing the learning outcomes     which the outcome is assessed       LO1     final test, written test     L, SW       LO2     final test, written test     L, SW       LO3     final test, written test     L, SW       LO4     final test, written test     L       LO5     written test     SW       LO6     final test     L       LO7     written test     SW       LO6     final test     L       LO7     written test     SW       Participation in lectures     30       participation in specialization workshop     15       preparation for specialization workshop     15       preparation for passing the lecture     5       preparation for passing the lecture     5       preparation for passing the specialization workshop     5       TOTAL:     75       Quantitative indicators     HOURS       Student workload – activities that require direct teacher participation     50 h	L07	opinions and the need for continuous deepening of knowledge	K_B1_K01 K_B1_K02				
LO2         final test         ⊥           LO3         final test, written test         ⊥, SW           LO4         final test         ⊥           LO5         written test         SW           LO6         final test         ⊥           LO7         written test         SW           LO6         final test         ⊥           LO7         written test         SW           LO7         written test         SW           LO7         written test         SW           LO7         participation in lectures         SU           participation in specialization workshop         15         15           preparation for specialization workshop         15         5           preparation for passing the lecture         5         5           preparation for passing the specialization workshop         5         5           Student workload – activities that require direct teacher participation         50 h         2,0	learning	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed				
LO3         final test, written test         L, SW           LO4         final test         L           LO5         written test         SW           LO6         final test         L           LO7         written test         SW           LO7         Student workload (in hours)         No. of hours           participation in lectures         30         30           participation in specialization workshop         15         5           preparation for specialization workshop         15         5           preparation for passing the lecture         5         5           preparation for passing the lecture         5         5           preparation for passing the specialization workshop         5         5           preparation for passing the lecture         5         5           preparation for passing the specialization workshop         5         5           Student workload – activities that require direct teacher participation         50 h         2,0	LO1	final test, written test	L, SW				
LO4         final test         L           LO5         written test         SW           LO6         final test         L           LO7         written test         SW           Student workload (in hours)         No. of hours           participation in lectures         30           participation in specialization workshop         15         15           preparation for specialization workshop         15         15           preparation for passing the lecture         5         5           preparation for passing the specialization workshop         5         5           preparation for passing the specialization workshop         5         5           Student workload – activities that require direct teacher participation         50 h         2,0	LO2	final test	L				
LO5         written test         SW           LO6         final test         L           LO7         written test         SW           LO7         Student workload (in hours)         No. of hours           Participation in lectures         30         30           participation in specialization workshop         15         30           preparation for specialization workshop         15         30           preparation for passing the lecture         5         5           preparation for passing the specialization workshop         5         5           Student workload – activities that require direct teacher participation         50 h         2,0	LO3	final test, written test	L, SW				
LO6       final test       L         LO7       written test       SW         Student workload (in hours)       No. of hours         participation in lectures       30         participation in specialization workshop       15         preparation for specialization workshop       15         participation in consultations for specialization workshop       5         preparation for passing the lecture       5         preparation for passing the specialization workshop       5         Quantitative indicators       HOURS       No. of ECTS credits         Student workload – activities that require direct teacher participation       50 h       2,0	LO4	final test	L				
LO7       written test       SW         Student workload (in hours)       No. of hours         participation in lectures       30         participation in specialization workshop       15         preparation for specialization workshop       15         preparation for passing the lecture       5         preparation for passing the specialization workshop       5         Quantitative indicators       HOURS       No. of ECTS credits         Student workload – activities that require direct teacher participation       50 h       2,0	LO5	written test	SW				
Student workload (in hours)       No. of hours         participation in lectures       30         participation in specialization workshop       15         preparation for specialization workshop       15         participation in consultations for specialization workshop       5         preparation for passing the lecture       5         preparation for passing the specialization workshop       5         Verticipation in consultative indicators       No. of ECTS         Calculation       Student workload – activities that require direct teacher participation       50 h	LO6	final test	L				
Participation in lectures     30       participation in specialization workshop     15       preparation for specialization workshop     15       participation in consultations for specialization workshop     5       preparation for passing the lecture     5       preparation for passing the specialization workshop     5       Verticipation in consultative indicators     No. of ECTS credits       Student workload – activities that require direct teacher participation     50 h     2,0	L07	written test SW		W			
Participation in specialization workshop       15         preparation for specialization workshop       15         participation in consultations for specialization workshop       5         preparation for passing the lecture       5         preparation for passing the specialization workshop       5         preparation for passing the specialization workshop       5         preparation for passing the specialization workshop       5         Quantitative indicators       TOTAL:         V       POURS         ECTS       credits         Student workload – activities that require direct teacher participation       50 h	Student workload (in hours)			No. of hours			
Calculation       preparation for specialization workshop       15         participation in consultations for specialization workshop       5         preparation for passing the lecture       5         preparation for passing the specialization workshop       5         preparation for passing the specialization workshop       5         preparation for passing the specialization workshop       5         Quantitative indicators       TOTAL:         Quantitative indicators       HOURS         ECTS       credits         Student workload – activities that require direct teacher participation       50 h		participation in lectures	30				
Calculation       participation in consultations for specialization workshop       5         preparation for passing the lecture       5         preparation for passing the specialization workshop       5         TOTAL:         VICTAL:         Output         Quantitative indicators         HOURS         Student workload – activities that require direct teacher participation		participation in specialization workshop	15				
preparation for passing the lecture       5         preparation for passing the specialization workshop       5         TOTAL: 75         Quantitative indicators         HOURS         Student workload – activities that require direct teacher participation         50 h	Calculation	preparation for specialization workshop	15				
preparation for passing the specialization workshop     5       TOTAL:     75       Quantitative indicators     HOURS     ECTS credits       Student workload – activities that require direct teacher participation     50 h     2,0		participation in consultations for specialization workshop					
TOTAL:       75         Quantitative indicators       HOURS       ECTS credits         Student workload – activities that require direct teacher participation       50 h       2,0		preparation for passing the lecture					
Quantitative indicators       HOURS       No. of ECTS credits         Student workload – activities that require direct teacher participation       50 h       2,0							
Quantitative indicators       HOURS       ECTS credits         Student workload – activities that require direct teacher participation       50 h       2,0		TOTAL:	7	-			
Student workload – activities that require direct teacher participation       50 h       2,0	Quantitative indicators			ECTS			
	Student workload – activities that require direct teacher participation			2,0			
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Basic references	<ul> <li>Blyth F., Freitas M., 1984. A Geology for Engineers. CRC Press</li> <li>Bowen R., 1984. Geology in engineering. Elsevier, New York.</li> <li>Desonie D., 2012. Earth Science For High School. eBooks at CK-12 FOUNDATION.</li> <li>Earle St., 2019. Physical Geology. eBooks at BCcampus Open Education.</li> <li>Hencher St., 2012. Practical Engineering Geology. CRC Press.</li> </ul>			
Supplementary references	Han D., 2010. Concise Hydrology. eBooks at bookboon.com King Ch., 2010. The planet we live on: The beginnings of the Earth Sciences. ebooks at Learning Development Institute			
Organisational unit conducting the course	Department of Agri-Food Engineering and Environmental Management	Date of issuing the programme		
Author of the programme	dr Piotr Kondratiuk	07.02.2019		

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar