



# Applied Environmental Geology /Environmental Status assessment and damage mitigation

Earth Science Engineer MSc course

2020/21 1. Semester

COURSE COMMUNICATION FOLDER

**University of Miskolc**  
**Faculty of Earth Science and Engineering**  
**Institute of Mineralogy and Geology**

## Course datasheet

<b>Tantárgy neve:</b> Applied Environmental Geology <b>Instructor:</b> Dr Viktor Mádai, associate professor	<b>Code:</b> MFFAT730032 <b>Responsibel department/institute:</b> Department of Geology and Minearl Deposits <b>Type of course:</b> C
<b>Position in curriculum (which semester):</b> 3	<b>Pre-requisites:</b> MFFAT720031
<b>Number of Contact Hours per Week (Lec.+prac.):</b> 2+2	<b>Type of Assessment (examination/practical mark/other):</b> exam
<b>Credits:</b> 4	<b>Course:</b> full-time
<b>Course Description:</b>  <i>Knowledge:</i> T1, T2, T3, T4, T5, T7, T8, T9  <i>Ability:</i> K1, K2, K3, K5, K6, K7, K8, K9, K11, K12, K13  <i>Attitude:</i> A1, A2, A3, A4, A5, A7  <i>Autonomy and responsibility:</i> F1, F2, F3, F4, F5	
<b>The short curriculum of the subject:</b> The main objective of the course is to make the students familiar with the effects of geological medium on the state and changes of the environment, and prepare them for revealing the geological background of environmental problems as well as mitigating or minimizing these problems.	
<b>Study goals:</b> System approach in geology, changes in the four main systems of the Earth. The objects, methods and legal background of environmental geology. Environmental minerals, their characteristics and role in causing and mitigating of environmental problems. Geological hazards (volcanism, earthquakes, mass movements). The role of geological medium in the anthropogenic contamination and pollution (processes of environmental geochemistry, interactions between soil, rocks and contamination, geological conditions effecting on the spreading of contamination). Geological and geochemical concerns of the effects of mining on the environment. Geological background of the radioactive waste disposal. Geology in nature protection. Geological tasks in the environmental assessment. Practical work: self-made solutions of simple case-study problems.	
<b>Method of course check in:</b> During registration week through NEPTUN system <b>Education method:</b> Lectures and seminars	
<b>Assesment and requirements:</b>  <b>Conditions fo signature:</b> Handing in the half year task in an exceptable format and level in time (last week of the semester), writing two tests at least on the minimum level of 51%. Failed tests are rewritable on the last week of the semester. Attendance of lectures and seminars are compulsory. Missing more than three occasions from lectures or seminars cause deny of signature.  <b>Conditions of successful completion of the subject:</b> signature + exam mark	
<b>Type of Assessment, grading limits:</b> Evaluation of the knowledge happens in 100% by the result of the exam. Reaching the 80% of the minimum questions , which is a compulsory constrain to start the oral or written exam. Oral exam: 0 - 50%: 1, 50 – 60%: 2, 60 – 70%: 3, 70 – 90%: 4, 90 – 100%: 5	
<b>Used teaching equipments:</b> Black board, choke, PC and projector . Course book: <i>Keller, E A: Introduction to Environmental Geology, Prentice Hall, 2011,</i>	

**compulsory literature resources:**

*Edgar, Spencer; Reichard, J S; Reichard, J: Environmental Geology*, McGraw-Hill, 2009,  
*Keller, E A: Introduction to Environmental Geology*, Prentice Hall, 2011,  
*Erickson, J.: Environmental Geology: Facing the Challenges of Our Changing Earth (Living Earth)*  
Amazon com, 2002

**Recommended literature resources:**

*Foley, Duncan: Investigations in environmental geology*, Prentice Hall, Upper Saddle River N.J, 2009,  
*Holland, H D.: Treatise on geochemistry*, Elsevier, New York NY, 2003  
*Keith, S.: Environmental hazards*, Routledge,, Abingdon, Oxon ;; New York :, 2008,  
*Knödel, Klaus: Environmental geology : handbook of field methods and case studies*, Springer, Berlin  
;; New York, 2007,  
*Montgomery, C W: Environmental Geology*, McGraw-Hill, 2010,  
*Patnaik, P.: Handbook of environmental analysis: chemical pollutants in air, water, soil, and solid wastes*, Taylor and Francis, 2009,  
*Bell F. G.: Geological Hazards: their assessment, avoidance and mitigation*. E & FN Spon, London, 1999  
*Lundgren L. W.: Environmental Geology*. Prentice-Hall International, London, 1999.

## Syllabus of the semester

Friday, 10-13, A/3. 303.

<b>Date</b>	<b>Lectures</b>	<b>Seminars</b>
2020.09.11.	Philosophy and Fundamental Concepts, Internal Structure of Earth and Plate Tectonics	Outlining the half year term tasks, documentation system, basic data, maps
2020.09.18.	Minerals and Rocks, Ecology and Geology	The basic usage of Global Mapper
2020.09.25.	Introduction to Natural Hazards, Earthquakes	Rectification, digitization of contour lines
2020.10.02.	Tsunami, Volcanic Activity	Rectification, digitization of contour lines
2020.10.09.	Rivers and Flooding	Rectification, digitization of contour lines
2020.10.16.	Slope Processes, Landslides, and Subsidence	Geomorphology, geographical position of the mapped terrain
2020.10.23.	<b>Holiday</b>	<b>Holiday</b>
2020.10.30.	Coastal Processes. Impact of Extraterrestrial Objects	I. Test. Marking of given slope categories Geology and geological mapping
2020.11.06.	Water Resources, Water Pollution	Marking of given slope categories
2020.11.13.	Mineral Resources and the Environment	Marking of frost endangered area maps (Rayons)
2020.11.20.	Energy Resources	Making of earthquake endangered area maps (Rayons)
2020.11.27.	Soils and Environment	Composite maps (Rayons)
2020.12.04.	Global Climate Change	Corrections, checking
2020.12.11.	Geology, Society, and the Future	II. Test, handing in the tasks

### **3. TEST**

1. Describe the basic elements of environmental geology! (10%)
2. Give a short description about petrogenetic system of metamorphic rocks! (20%)
3. Describe the earthquake hazards and how to mitigate the potential damages of it!  
(20%)
4. Give a short description about Tsunami events! (20%)
5. Describe the volcanic hazards and how to mitigate the potential damages of it ! (10%)
6. Give a short description about floods and how to mitigate the potential damages of it!  
(10%)
7. Describe the slope as a dynamic environment! (10%)

#### **4. HALF-YEAR TASK**

Create a 6 km<sup>2</sup> map in digitized form from base maps Ratio: 1:10 000

Categorize the :

- 1, slopes,
- 2, slope forms,
- 3, extinctions,

Create composite maps (Rayons) from the above mentioned maps, describing the main possible functions of the given terrain: house building purpose, gardening.

## **5. EXAM QUESTIONS:**

1. Outline the Internal Structure of Earth!
2. Give a short descriptions about some Minerals and Rocks!
3. Describe the Earthquake hazards!
4. outline the hazardous phenomenon of Rivers and Flooding!
5. Describe the Volcanic Activity from environmental point of view!

## **6. OTHER REQUIREMENTS**

During the writing of tests and exams the usage of mobile phones are forbidden.

Miskolc, 27. August. 2020.

Dr. Má dai Viktor  
associate professor