

## Geosciences

Code: MK5FDTIS03KX17-EN

ECTS Credit Points: 3

Evaluation: mid-semester grade

Year, Semester: 1<sup>st</sup> year/1<sup>st</sup> semester

Number of teaching hours/week (lecture + practice): 2+0

### Topics:

Geological and geotechnical exploration; sampling, description of localities, field measurements and their instruments. Geological, hydrogeological data collection, archive data bases, and their application. Protection of the geological environment and the groundwater sources. Pollutants and limits. Pollution transport, risk analysis and assessment. Documentation of concerning the geological environment and groundwater systems (preliminary studies, environmental impact assessment, revision, steady state analysis, site assessment, remediation). Review of remediation and treatment technologies; planning and performance of remediation; monitoring. Basic concepts of protection of water resources, diagnostics and securing of water resources. Geological and hydrogeological background of waste disposal.

### Literature:

#### Required:

- Foley, D et al. 2009: Investigation in environmental geology. Prentice Hall, N.J.
- Reichard, J.S., 2009: Environmental geology. McGraw-Hill.

#### Recommended:

- White, W.M., 2007: Geochemistry. John Hopkins University Press.

### Schedule

<b>1<sup>st</sup> week Registration week</b>	
<b>2<sup>nd</sup> week:</b> Origin of Solar System. The Earth's system. Earth materials: rock-forming minerals, igneous rocks.	<b>3<sup>rd</sup> week:</b> Weathering, sedimentary rocks. Metamorphic rocks.
<b>4<sup>th</sup> week:</b> Rock cycle. Earth's interior. Plate tectonics. Hazardous Earth processes. Volcanic activity and volcanic hazards.	<b>5<sup>th</sup> week:</b> Mass wasting, slope stability, landslides, avalanches and their hazards.
<b>6<sup>th</sup> week:</b> Streams and floods and their hazards. Coastal processes and hazards. Soil resources, human activity and soils.	<b>7<sup>th</sup> week:</b> Elements of hydrologic cycle. Surface and ground water. Basics of hydrology and hydrogeology. Sources of freshwater.
<b>8<sup>th</sup> week: 1<sup>st</sup> drawing week</b>	
<b>9<sup>th</sup> week:</b> Pollution and contamination. Various types of contaminants, their physical-chemical properties and effects on human health and ecosystem.	<b>10<sup>th</sup> week:</b> Transport processes: contaminant in surface and groundwater, soil and soil gas. Human risk assessment.
<b>11<sup>th</sup> week:</b>	<b>12<sup>th</sup> week:</b>

Strategies and techniques in environmental geology; field and laboratory techniques. Soil, soil gas and groundwater sampling, drilling techniques, well installing.

**13<sup>th</sup> week:**

Remediation techniques and technologies for cleaning up contaminated sites.

Introduction to sustainability. Geological resources resource planning. Environmental impact assessment, environmental site assessment, remediation.

**14<sup>th</sup> week:**

Solid and liquid wastes. Waste disposal regarding geological and hydrogeological backgrounds. Effect of mining of mineral resources..

**15<sup>th</sup> week: 2<sup>nd</sup> drawing week**

**Requirements**

**A, for a signature:**

Attendance at lectures is recommended.

**B, for a grade:**

The course ends in a written end-term test.

The minimum requirement of the end-term test is 60%. The grade is given according to the following (score/grade): 0-59 = fail (1); 60-69 = pass (2); 70-79 = satisfactory (3); 80-89 = good (4); 90-100 = excellent (5).

If the score of the test is below 60, students can retake that test in conformity with the EDUCATION AND EXAMINATION RULES AND REGULATIONS.