



Syllabus

Term: 2026/27/1 **Subject name:** Introduction to hydrology and hydrogeology **Subject code:** AFOTNAA1501

Unit (Unit code) Institute of Geography and Earth Sciences (FOLDRAJZ)

Lecturer responsible for the course: Dr. FARICS Éva

Requirement: Term mark

Classes per week : 0/0/2/0

Classes per term: 0/0/26/0

Purpose of education:

The course introduces students to fundamental hydrological calculations, including water balance, evaporation, precipitation intensity, and climate indices. Through case studies, they explore the hydrogeological functioning of porous and karst aquifers, methods for estimating extractable groundwater, and approaches to water chemistry analyses. Students also practice interpreting hydrogeological maps and gain an overview of Hungary's geothermal potential. By integrating these topics, they develop an understanding of the interactions and causal relationships within hydrological and hydrogeological systems, as well as the ability to think in a systems-oriented way.

Contents:

Week 1. Water balance calculation for different types of water bodies. Questions related to the elements of the hydrological cycle.

Week 2. Capillary action calculation. In pairs: Calculation tasks on atmospheric water vapor.

Week 3. Estimation of open water evaporation, evapotranspiration of vegetation. Group work: Aridity index.

Week 4. Group work: Calculation of precipitation intensity. Calculation of average daily precipitation. Calculation of daily precipitation totals.

Week 5. Group work: Calculation of precipitation-based climate indices.

Week 6. First midterm exam.

Week 7. Hydrogeological characteristics of porous aquifer systems. Case study.



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Week 8. Groundwater flow. Darcy's Law. Water chemistry. Case study.

Week 9. Exchange of water between lakes and groundwater. Case study.

Week 10. Karst aquifers. Calculating pore volume in high-karst springs.

Week 11. Estimating extractable groundwater resources and deformation of water-saturated rocks.

Week 12. Group work: Case study on geothermal energy in Hungary.

Week 13. Second midterm exam.

System of examining and valuation:

Midterm exams: two written tests (Week 7 – material from Weeks 1–6; Week 13 – full semester). Each includes both calculation and theoretical tasks.

Homework: Weekly assignments; each must reach at least a passing level.

One make-up/retake opportunity is available in the first week of the examination period.

If a midterm is missed (any reason), it may be retaken. If the other test also requires improvement, both can be retaken at the same time.

Homework cannot be retaken; late or missing submissions receive 0 points.

Weighting

Midterm exams: 30–40%



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System of examining and valuation:

Homework: 30%

Grading Scale

- $< 50\%$ → Fail (1)
- 51–64.99% → Pass (2)
- 65–74.99% → Satisfactory (3)
- 75–84.99% → Good (4)
- $\geq 85\%$ → Excellent (5)

Bibliography:

Hudak P.F. (2000) *Principles of Hydrogeology*. Second Edition. CRC Lewis Publishers 204 p.

Bibliography:

Tóth J. (2009) *Gravitational systems of groundwater flow: Theory, evaluation, utilization*. Cambridge University Press.