

# SUBJECT DATASHEET

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## I. SUBJECT SPECIFICATION

### 1 BASIC DATA

#### 1.1 Title

HYDROGEOLOGY

#### 1.2 Code

BMEEOGMMG62

#### 1.3 Type

Module with associated contact hours

#### 1.4 Contact hours

type	hours/week
lectures	2

#### 1.5 Evaluation

midterm grade

#### 1.6 Credits

3

#### 1.7 Coordinator

name: Dr. Péter Görög  
academic rank: assistant professor  
email: [gorog.peter@epito.bme.hu](mailto:gorog.peter@epito.bme.hu)

#### 1.8 Department

Department of Engineering Geology and Geotechnics ([www.gmt.bme.hu](http://www.gmt.bme.hu))

#### 1.9 Website

[www.epito.bme.hu/BMEEOGMMG62](http://www.epito.bme.hu/BMEEOGMMG62)

#### 1.10 Language of instruction

Hungarian and/or English

#### 1.11 Curriculum requirements

Optional in the Structural engineering (MSc) programme

#### 1.12 Prerequisites

None

#### 1.13 Effective date

September 1, 2017.

## 2 OBJECTIVES AND LEARNING OUTCOMES

### 2.1 Objectives

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The goal of the subject, that the students getting familiar with the geological, geophysical methods of water exploration, the stratigraphy of ground, karstic and fissure water, the origin and properties of ground water (temperature, chemical nature). The students acquire the methodology for recharge, water flow, infiltration calculations, furthermore the water level and discharge measurements, water tracing and modelling the water flow in karstic and jointed rock mass. They learn the properties, classification and usage of thermal water. The subject introduce to the students the regional water management, the hydrogeological effect of mining and civil engineering, protecting of water resources through case studies. They get information about the dewatering methods and learn the usage of hydrogeological models for civil engineering works.

### 2.2 Learning outcomes

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Upon successful completion of this subject, the student:

#### A. Knowledge

1. knows the methods of water exploration,
2. knows the stratigraphy, origin and properties of ground water,
3. knows the basic hydrogeological calculation methods,
4. aware of methodology of the basic hydrogeological in-situ measurements,
5. knows the hydrogeological model of karstic and other jointed aquifers,
6. aware of the basic dewatering methods,
7. knows the fundamentals of the hydrogeological modelling,

#### B. Skills

1. able to perform simpler infiltration calculations,
2. able to design in-situ hydrogeological measurements,
3. able to use the hydrogeological model of karstic and jointed aquifers,
4. able to choose dewatering method if there are appropriate basic data,
5. able to build a hydrodynamic model for civil engineering purposes,
6. able to express her/his thoughts orderly in written and oral.

#### C. Attitudes

- a) improve her/his knowledge with continuous learning,
- b) open to use the information technology tools,
- c) pursue to know and use of the toolkit which need for the hydrogeological problem solution,
- d) pursue to the exact and errorless task solution.

#### D. Autonomy and responsibility

1. thinks through and solve independently the hydrogeological tasks and problems according to given sources,
2. open to accept the critical comments,
3. use the systematic approaches in her/his mind.

### 2.3 Methods

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Lectures, practical tasks, communication in written and oral form, use of IT tools and technics, task solved independently and in groups as well, work organization technics.

## 2.4 Course outline

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week: Topics of lectures and/or exercise classes

1. Classification of ground water.
2. Karstic aquifers, protection of karstic water.
3. Utilization, protection of ground water: bank-filtered water, thermal water (geothermal usage).
4. Hydrogeological in-situ tests.
5. Pumping test: usage and evaluation of results.
6. Water balances in engineering geology.
7. Water flow in jointed rock masses.
8. Hydrogeology and environmental protection. Ground water in civil engineering practice.
9. Dewatering methods.
10. Hydrogeological modelling I.: model parameters.
11. Hydrogeological modelling II.: setting up a model.
12. Numerical solution of hydrogeological project.
13. Dewatering calculation of an excavation.
14. Relation between hydrogeology and the civil engineering facilities.

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

## 2.5 Study materials

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a) Textbooks

1. Fetter C.W. (2001) Applied hydrogeology

b) Online materials

1. Lecture notes

## 2.6 Other information

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- 1) The department provides the academic version of the introduced software.

## 2.7 Consultation

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The instructors are available for consultation during their office hours, as advertised on the department website. Special appointments can be requested via e-mail: [grog.peter@epito.bme.hu](mailto:grog.peter@epito.bme.hu)

## II. SUBJECT REQUIREMENTS

### 3 ASSESSEMENT AND EVALUATION OF THE LEARNING OUTCOMES

#### 3.1 General rules

The assessment of the learning outcomes specified in clause 2.2. above and the evaluation of student performance occurs via tests, homework assignments.

#### 3.2 Assesement methods

Evaluation form	abbrev.	assessed learning outcomes
1. midterm test	MT1	A.1-A.4; B.1; B.2; B.6; C.2; C.4; C.5; D.2
2. midterm test	MT2	A.5-A.7; B.3-B.6; C.2; C.4; C.5; D.2
1. homework	HW	A.1-A.7; B.1-B.6; C.1-C.4; D.1-D.3

The dates of midterm tests and deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

#### 3.3 Evaluation system

abbreviation	score
MT1	35%
MT2	35%
HW	30%
<b>Sum</b>	<b>100%</b>

The midterm test is failed if the sum points of the two tests is less than the 50% of the obtainable points. In case of the homework to reach the 50% of the points is also required.

#### 3.4 Requirements and validity of signature

There is no signature for this subject.

#### 3.5 Grading system

Determination of the final grade is according to the below described considerations:

There is no minimum requirement for the midterm tests separately, the sum results of the two midterm test have to reach the 50% of the obtainable points.

The final grade is the average value of the result of the two midterm test and the homework weighted according to the clause 3.3.

grade	points (P)
excellent (5)	$80 \leq P$
good (4)	$70 \leq P < 80\%$
satisfactory (3)	$60 \leq P < 70\%$
passed (2)	$50 \leq P < 60\%$
failed (1)	$P < 50\%$

### 3.6 Retake and repeat

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- 1) There is no minimum requirement for the individual midterm tests therefore it cannot be retake separately.
- 2) Homework – after the payment of the fee determined in the regulation – can be submit with delay until 16.00 or in electronic format until 23.59 of the last day of the completion week.
- 3) The submitted and accepted homework can be corrected without any fee until the deadline described in the point 2.
- 4) The two midterm test can be retaken in merged form in the completion week free of charge. In case of correction the better result will be taking into account from the new and previous results.

### 3.7 Estimated workload

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<b>activity</b>	<b>hours/semester</b>
contact hours	14×2=28
preparation for the courses	14×1=14
preparation for the tests	2×12=24
homework	12
home studying of the written material	12
<b>in total</b>	<b>90</b>

### 3.8 Effective date

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September 1, 2017.