

## I. Subject Specification

### 1. Basic Data

#### 1.1 Title

Hydrogeology of subsurface water

#### 1.2 Code

BMEEOGMDT81

#### 1.3 Type

Module with associated contact hours

#### 1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

#### 1.5 Evaluation

Exam

#### 1.6 Credits

3

#### 1.7 Coordinator

name	Dr. Görög Péter
academic rank	Associate professor
email	<a href="mailto:gorog.peter@emk.bme.hu">gorog.peter@emk.bme.hu</a>

#### 1.8 Department

Department of Engineering Geology and Geotechnics

#### 1.9 Website

<https://epito.bme.hu/BMEEOGMDT81>  
<https://edu.epito.bme.hu/course/view.php?id=2531>

#### 1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Ph.D.

1.12 Prerequisites

1.13 Effective date

1 September 2017

## 2. Objectives and learning outcomes

### 2.1 Objectives

The goal of the subject is that the students are getting familiar with the properties, types, occurrences, and effects of subsurface water. It is important to introduce the relationship between civil engineering and hydrogeology fields so the students know how hydrogeology relates to their individual scientific topics. They learn the basic usage of hydrogeological modelling tools, and how groundwater and waterflow affect civil engineering works. It is also introduced what the effect of a civil engineering project on a protected or sensitive aquifer.

### 2.2 Learning outcomes

Upon successful completion of this subject, the student:

#### A. Knowledge

1. knows the classification of groundwater,
2. knows what the difference between porous media and rock masses in point of the groundwater is,
3. knows the speciality of karstic aquifers,
4. aware of the basic hydrogeological modelling methods,
5. knows how to deal with protected and sensitive aquifers in civil engineering point of view,
6. aware of the most important relations between the results of civil engineering works and the groundwater,

#### B. Skills

1. able to determine the hydrogeological parameters of a porous media,
2. able to use the model of karstic and jointed aquifers,
3. able to determine the effect of groundwater to civil engineering works,
4. able to do a presentation about a given topic,
5. able to express her/his thoughts orderly in written and oral.

## C. Attitudes

1. improve her/his knowledge with continuous learning,
2. open to use the information technology tools,
3. pursue to know and use of the toolkit which need for the hydrogeological problem solution,
4. pursue to the exact and errorless task solution.

## D. Autonomy and Responsibility

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

## 2.3 Methods

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

Week Topics of lectures and/or exercise classes

1. Introduction to subsurface water.
2. Classification of ground water.
3. Ground water in porous media: permeable and nonpermeable layers, confined, nonconfined aquifers.

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4. Ground water in rocks: karstic and fractured aquifers.
5. The theory of double porosity.
6. Protected and sensitive aquifers.
7. Effect of civil engineering works on ground water.
8. Hydrogeological modelling methods, seepage calculation.
9. Civil engineering projects and ground water – Case study I.
10. Civil engineering projects and ground water – Case study II.
11. Civil engineering projects and ground water – Case study III.
12. Presentations of students' individual projects – discussion I.
13. Presentations of students' individual projects – discussion II.
14. Summary of the subject, oral discussion of outcomes with the students.

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

### a) Textbooks

Fetter C.W. (2001) Applied hydrogeology

### b) Online materials

Lecture notes

## 2.6 Other information

The department provides the academic version of the introduced software.

### 2.7 Consultation

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

This Subject Datasheet is valid for:

2024/2025 semester I

## II. Subject requirements

Assessment 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 Assessment methods

<b>Evaluation form</b>	<b>abbrev.</b>	<b>assessed learning outcomes</b>
1. Homework	HW	A.1-A.6; B.1-B5; C.1-C.4;
2. Presentation	PR	A.1-A.6; B.1-B5; C.1-C.4;
3. Exam	EX	A.1-A.6; B.1-B5; C.1-C.4;

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

### 3.3 Evaluation system

<b>abbreviation</b>	<b>score</b>
HW	25%
PR	25%
EX	50%
<b>Sum</b>	<b>100%</b>

## 3.4 Requirements and validity of signature

It is required for the signature to fulfil the homework and presentation requirements.

## 3.5 Grading system

<b>Grade</b>	<b>Points (P)</b>
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

- 1) Homework – after the payment of the fee determined in the regulation – can be submitted with delay until 16.00 or in electronic format until 23.59 of the last day of the completion week.
- 2) The submitted and accepted homework can be corrected without any fee until the deadline described in the point 2.
- 3) The presentation can be retaken in the completion week free of charge. In case of correction the better result will be taken into account from the new and previous results.

## 3.7 Estimated workload

<b>activity</b>	<b>hours/semester</b>
contact hours	$14 \times 2 = 28$
preparation for the courses	$14 \times 1 = 14$
homework and presentation	$24 + 12 = 36$
home studying of the written material	12



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in total 90

3.8 Effective date

1 September 2017

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