Water and wastewater treatment II. - BMEEOVKMV-1

I. Subject Specification

1. Basic Data

1.1 Title

Water and wastewater treatment II.

1.2 Code

BMEEOVKMV-1

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	3

1.5 Evaluation

Exam

1.6 Credits

4

1.7 Coordinator

name	Dr. Laky Dóra
academic rank	Associate professor
email	laky.dora@emk.bme.hu

1.8 Department

Department of Sanitary and Environmental Engineering

1.9 Website

https://epito.bme.hu/BMEEOVKMV-1
https://fiek2.mywire.org/course/view.php?id=3487

1.10 Language of instruction

english

1.11 Curriculum requirements

-

1.12 Prerequisites

Recommended prerequisites:

- Water and wastewater treatment (BMEVETOK017)

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The aim of the course is to introduce the complex processes taking place during drinking water and wastewater treatment technologies:

- Technological lines suitable for the purification of drinking water, especially in the case of deep water bases, with special regard to the removal of iron, manganese, arsenic and ammonium ions
- Water quality changes in the water distribution system
- Analysis of case studies (technological deficiencies, water quality deterioration in the water distribution system)
- Possible technologies for wastewater treatment for large, medium and small wastewater treatment plants
- Activated sludge methods, biofilm methods, case studies, sludge treatment, biogas utilization, energy balance of wastewater treatment plants

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. Contaminants in water sources and their removal technologies.
2. Technologies used in wastewater treatment plant.
3. Secondary water quality deterioration processes in the drinking water supply network, their effects.
4. Basics of activated sludge and biofilm wastewater treatment.
5. Wastewater treatment technologies of large wastewater treatment plants.
6. Wastewater treatment technologies of medium wastewater treatment plants.
7. Wastewater treatment technologies of small wastewater treatment plants.
8. Treatment options for sewage sludge, conditions for biogas utilization.
9. Basics of energy balance in wastewater treatment plants.

B. Skills

1. Desing of complex drinking water treatment technologies.
2. In the case of water abstraction from a deep aquifer, assessing the water quality problems at the case study area and outline proposals for their solution.
3. Depending on the size of the wastewater treatment plant, designing technological lines.

C. Attitudes

1. Collaborates with the instructor and groupmates.

2. Expands his / her knowledge by constantly acquiring knowledge, and for this, in addition to the compulsory curricula, looking for answers to questions from web resources.
3. Strives for comprehensible, precise wording in oral communication, and strives for the sophisticated documentation required by the engineering profession.

D. Autonomy and Responsibility

1. Independence and responsibility
2. Cooperation with fellow students in teamwork.

2.3 Methods

Lectures with theoretical knowledge; written and oral communication. Use of IT tools and techniques. Solving case study tasks together or in group work.

2.4 Course outline

Hét	**Előadások és gyakorlatok témaköre**
1.	Lectures with theoretical knowledge; written and oral communication. IT tools and techniques use. Solving case study tasks together or in group work.
2.	Basics of wastewater treatment, block diagrams of wastewater treatment plants
3.	Case study area - evaluation of drinking water quality problem, possible solutions (case study No.1)
4.	Case study area - evaluation of drinking water quality problem, possible solutions (case study No.2)
5.	Case study area - evaluation of drinking water quality problem, possible solutions (case study No.3)
6.	Case study area - evaluation of drinking water quality problem, possible solutions (case study No.4)
7.	Drinking water quality changes in the water supply network
8.	Activated sludge and biofilm methods for wastewater treatment
9.	Large wastewater treatment plants
10.	Wastewater treatment technologies for small and medium-sized plants
11.	Sludge treatment, biogas utilization
12.	Energy balance of wastewater treatment plants
13.	Wastewater treatment plants (case study No.1)
14.	Wastewater treatment plants (case study No.2)

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

2.6 Other information

Attendance at lectures is mandatory. Missing out more than 30% of the lectures means failing the subject.

2.7 Consultation

Consultations: At the beginning of the semester at the consultation time announced on the department's website or contact the lecturers via e-mail:(Dóra Laky: laky.dora@emk.bme.hu; Miklós Patziger: patziger.miklos@emk.bme.hu)

This Subject Datasheet is valid for:

2023/2024 semester I

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

The learning outcomes defined in point 2.2 are assessed based on a mid-term test, and a written and oral exam during exam period.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Test 1	T1	A.1-A.4; B.1-B.2; C.1-C.3; D.1-D.2
Exam	E	A.1-A.9; B.1-B.3; C.1-C.3; D.1-D.2

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

3.3 Evaluation system

Abbrev.	Score
T1	30%
E	70%
Sum	**100%**

3.4 Requirements and validity of signature

The criterion for completion of the subject is to: collect at least 45% of the total points of the written test (T1) and get at least Passed (2) grade at the exam.

3.5 Grading system

Grade	Percentage (P)
Excellent (5)	85<=P
Good (4)	70<=P<85%
Satisfactory (3)	57<=P<70%
Passed (2)	45<=P<57%
Failed (1)	P<45%

3.6 Retake and repeat

It is possible to retake the mid-term T1 two times: first time for free, second time for extra fee.

3.7 Estimated workload

Activity	Hours/semester
Contact hours	14×3=42
Preparation for the tests	50
Preparation for the exam	28
Sum	**120**

3.8 Effective date

1 September 2022

This Subject Datasheet is valid for:

2023/2024 semester I