Earthworks - BMEEOGMAT43

I. Subject Specification

1. Basic Data

1.1 Title

Earthworks

1.2 Code

BMEEOGMAT43

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2
Seminar	1

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Takács Attila
academic rank	Assistant professor
email	takacs.attila@emk.bme.hu

1.8 Department

Department of Engineering Geology and Geotechnics

1.9 Website

https://epito.bme.hu/BMEEOGMAT45
https://fiek2.mywire.org/course/view.php?id=436

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Compulsory in the Civil Engineering (BSc) programme

1.12 Prerequisites

Strong prerequisites:

- Soil Mechanics (BMEEOGMAT42)

1.13 Effective date

5 February 2020

Earthworks - BMEEOGMAT43

2. Objectives and learning outcomes

2.1 Objectives

The scope of the subject is to teach the students the basics of earthworks and retaining structures, such as different earth pressure theories, different retaining structure systems and their design rules, basics of design methods according to Eurocode 7, determination of characteristical values of soil properties in engineering practice, slope stability analysis, shear strength properties, different slip surface geometries, theoretical background of slope stability calculation methods. The student shall be familiar with quality control. Furthermore, the types, technologies and applicability limits of soil improvement, soil stabilization and dewatering will be presented.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. know the expressions used in earthworks design
2. know the principles of earthworks design
3. know the different slope stability calculation methods
4. know the determination of forces acting in case of stability problems
5. know the different quality control methods
6. now the basics of design rules according to Eurocode 7 and the determination of characteristical values of soil properties in engineering practice
7. know the commonly used geosynthetic materials

B. Skills

1. is able to design retaining structures
2. is able to understand the use of geosynthetic materials
3. is able to solve slope stability problems
4. is able to use design methods according to Eurocode 7 and determine the characteristical value
5. is able to use computer programs for designing and solving stability problems
6. is able to create reports about earthworks design

C. Attitudes

1. is cooperative with the teacher in gaining new knowledge
2. is continuously expanding his/her knowledge through learning
3. strives for knowledge and practice of design methods in case of geotechnical problems strives for accurate task solving

D. Autonomy and Responsibility

1. individually assesses tasks associated with earthworks, as well as their solution based on given sources
2. applies a systematic way of thinking

2.3 Methods

Lectures, calculation examples during lectures and written communication.

2.4 Course outline

Week	Topics of lectures and/or exercise classes
1.	Lateral earth pressures, at rest active and passive Rankine state.
2.	Rebhann-graphical solution.
3.	Coulomb method, Poncelet-graphical solution.
4.	Design of earthworks based on Eurocode 7.
5.	Design of retaining structures Part 1.
6.	Design of retaining structures Part 2.
7.	Design of slopes and stability analysis.
8.	Earthworks constructions – materials classification.
9.	Earthworks constructions – different technologies.
10.	Compaction methods of soils.
11.	Quality control.
12.	Dewatering of earthworks Part 1.
13.	Dewatering of earthworks Part 2.
14.	Geosynthetic materials in earthworks.

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

Kézdi Á.: Földművek / Earthworks (electronic notes)
Kézdi Á.: Földművek víztelenítése/ Dewatering of Earthworks (electronic notes)
Kézdi Á.: Talajmechanika/ Soil Mechanics
Electronic (lecture) notes: Attila Takács- Imre Laufer – Zoltán Bán: Supplementary material

2.6 Other information

2.7 Consultation

The instructors are available for consultation during their office hours, as advertised on the department website.

Special appointments can be requisted via email: varga.gabriella@emk.bme.hu

Earthworks - BMEEOGMAT43

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 assessment of the learning outcomes specified in clause 2.2. above and the evaluation of student performance occurs via one midterm test, two projects and one written exam.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
midterm test	ZH	A.1-A.7; B.1-B.6
Project1	HF1	A.1-A.6; C.1-C.3; D.1-D.2
Project2	HF2	A.3; C.1-C.3; D.1-D.2
written exam	V	A.1-A.6; B.1-B.6; C.1; D.1

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

3.3 Evaluation system

Abbreviation	Score
ZH	14%
HF1	18%
HF2	8%
midterm activities together	40%
V	60%
Sum	**100%**

3.4 Requirements and validity of signature

Fulfilment of the class attendance requirements and successful completion of each midterm test (min. 50%) are necessary to receive a valid signature.

3.5 Grading system

Grade	Points (P)
excellent(5)	85<=P
good(4)	75<=P<85%
satisfactory(3)	65<=P<75%
passed(2)	50<=P<65%
failed(1)	P<50%

3.6 Retake and repeat

In case of failing a retake described in the point 3. there is a possibility for a second retake in the supplementary period, after the payment of the fee determined in the Studies and Exams Regulations. Only one midterm test may be retaken twice.

3.7 Estimated workload

Activity	**Hours/semester**
contact hours	14×3=42
preparation for contact hours	12
preparation for the midterm test	6
projects	20
preparation for the exam	10
Sum	**90**

3.8 Effective date

1 September 2020

This Subject Datasheet is valid for:

2023/2024 semester I