Foundation Engineering - BMEEOGMAT45

I. Subject Specification

1. Basic Data

1.1 Title

Foundation Engineering

1.2 Code

BMEEOGMAT45

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	Móczár Balázs Ph.D.
academic rank	Associate professor
email	moczar.balazs@emk.bme.hu

1.8 Department

Department of Engineering Geology and Geotechnics

1.9 Website

https://edu.bme.hu/BMEEOGMAT45
https://fiek2.mywire.org/course/view.php?id=1380

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Optional in the Civil Engineering (BSc) programme

1.12 Prerequisites

Strong prerequisites:

- Earthworks (BMEEOGMAT43)

1.13 Effective date

1 September 2021

2. Objectives and learning outcomes

2.1 Objectives

The scope of the subject is to teach the students the basics of building foundations, construction pit shoring and dewatering. The student shall be familiar with the classification and types of foundations. He/she shall be familiar with ultimate limit states and serviceability limit states associated with shallow foundations, with basic sizing methods to determine the foundation geometry, with calculation methods of stresses and settlements below foundations, with the measurements and tolerance against differential settlement of buildings, as well as with the sources of harmful settlements. Furthermore, the types, technologies and applicability limits of deep foundations, construction pit shoring and dewatering will be presented.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. know the basic types of foundations
2. know the ultimate limit states and serviceability limit states of shallow foundations
3. know the methods for sizing foundation and to determine their settlement
4. know the classification and technologies of deep foundations
5. know the types and applications of construction pit shoring techniques
6. know the types and applications of dewatering techniques

B. Skills

1. is able to select the foundation type
2. is able to determine the size of shallow foundations
3. is able to calculate the stresses below shallow foundations
4. is able to calculate the settlement of shallow foundations
5. is able to classify deep foundation techniques

C. Attitudes

1. continuously expanding his/her knowledge through learning
2. seeks to learn and routinely employ the design framework for geotechnical problem solving
3. strives for accurate task solving

D. Autonomy and Responsibility

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

2.3 Methods

Lectures, calculation examples during lectures, written communication.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	Role and requirements of foundations. Ground investigation.
2.	Soil exploration, ground investigation methods.
3.	Failure mechanism of spread foundations. Cross-sectional design.
4.	Types and design methods of shallow foundations. Limit states.
5.	Calculation of bearing capacity of spread foundations.
6.	Calculation of stability of spread foundations.
7.	Calculation of bearing capacity of spread foundations. Calculation of stability of spread foundations.
8.	Calculation of stresses beneath spread foundations. Calculation of stresses and settlements below spread foundations.
9.	Calculation of settlements of spread foundations. Measurement of settlements.
10.	Sources of harmful settlements, and protective measures against them.
11.	Types, design and bearing capacity of deep foundations.
12.	Foundations in unfavourable soil conditions. Effects on shallow foundations.
13.	Construction of foundations. Construction pit shoring.
14.	Earth anchors. Dewatering of construction pits.

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

- Textbook: Dr. Farkas József-Józsa Vendel: Alapozás (electronic notes)
- Electronic (lecture) notes: Kádár István: Lecture slides (and practice material)

2.6 Other information

The Lectures on the English language course are held by Kádár István Ph.d. (kadar.istvan@emk.bme.hu)

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: kadar.istvan@emk.bme.hu, moczar.balazs@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 assessment of the learning outcomes specified in clause 2.2. above and the evaluation of student performance occurs via 2 midterm tests and a written exam.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
1. midterm test	MT1	A.1-A.3; B.2; C.3; D.1-D.2
2. midterm	MT2	A.1-A.3; B.3-B.4; C.3; D.1-D.2
written exam	E	A.1-A.6; B.1-B.5; 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

Abbreviation	Score
MT1	25%
MT2	25%
midterm activities together	50%
E	50%
Sum	**100%**

The midterm tests are failed if the sum points of the tests is less than the 50% of the obtainable points. Obtaining less than 50% in the exam results in a failed mark, regardless of the midterm scores achieved.

3.4 Requirements and validity of signature

To fulfill the midterm tests.

3.5 Grading system

Determination of the final grade is according to the below described considerations:
At least 50% of the obtainable points must be achieved in each of the midterm tests.
At least 50% of the obtainable points must be achieved in the written exam.
The final grade is the weighted average value of the result of the midterm tests and the exam according to the clause 3.3.

Grade	Points (P)
excellent (5)	85%<=P
good (4)	70<=P<85%
satisfactory (3)	60<=P<70%
passed (2)	50<=P<60%
failed (1)	P<50%

3.6 Retake and repeat

Each of the two midterm tests can be retaken free of charge once. In case of failing a retake described in the point 3. there is a possibility for a second retake – after the payment of the fee determined in the regulation – in the supplementary period. Only one midterm test can be retaken twice.

3.7 Estimated workload

Activity	**Hours/semester**
contact hours	14×3=42
preparation for the contact hours	14×2+7×2=42
preparation for the midterms	2×8=16
preparation for the exam	20
Sum	**120**

3.8 Effective date

1 September 2021

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2023/2024 semester I