Soil Mechanics - BMEEOGMAT42

I. Subject Specification

1. Basic Data

1.1 Title

Soil Mechanics

1.2 Code

BMEEOGMAT42

1.3 Type

Module with associated contact hours

1.4 Contact hours

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

1.5 Evaluation

Midterm grade

1.6 Credits

4

1.7 Coordinator

name	András Mahler PhD
academic rank	Associate professor
email	mahler.andras@emk.bme.hu

1.8 Department

Department of Engineering Geology and Geotechnics

1.9 Website

https://epito.bme.hu/BMEEOGMAT42
https://fiek2.mywire.org/course/view.php?id=435

1.10 Language of instruction

english

1.11 Curriculum requirements

Compulsory in the Civil Engineering (BSc) programme

1.12 Prerequisites

Strong prerequisites:

- Geology (BMEEOGMAT41)
- Introduction to Strength of Materials (BMEEOTMAT42)

Recommended prerequisites:

- Hydraulics I. (BMEEOVVAT42)

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The scope of the subject is to teach the students the followings: fundamentals of geotechnics, origin of soils, types of soil exploration and soil samples, composition of soils (phase relationships), soil classification (particle size distribution, Atterberg limits) and compaction of soils. After the course the student is able to calculate vertical stress distribution in soil masses (with and without seepage), seepage in soils (Darcy's law, hydraulic gradient, coefficient of permeability) and gets know the relationships of soil compressibility (primary consolidation, secondary compression) and the shear strength of soils (Mohr-Coulomb failure criterion, determination shear strength parameters)

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows the phase relationships of soils,
2. knows the soils classification procedures and the corresponding laboratory tests,
3. knows the seepage relationships,
4. knows the deformation characteristics of soils,
5. knows the shear strength parameters of soils.

B. Skills

1. is able to evaluate the basic geotechnical laboratory results,
2. is able to classify the soil based laboratory test results,
3. is able to solve simple one dimensional water flow problems,
4. is able to calculate soil compression for simple problems,
5. is able to determine shear strength parameters of soils.

C. Attitudes

1. is cooperative with the teacher in gaining new knowledge,
2. is continuously expanding his/her knowledge through learning,
3. strives for accurate task solving

D. Autonomy and Responsibility

1. individually assesses geotechnical problems, as well as their solution based on given sources
2. applies a systematic way of thinking

2.3 Methods

Lectures, practical and laboratory classes, and written communication.

2.4 Course outline

Week	Topics of lectures and/or exercise classes
1.	Composition of soils
2.	Phase and mass relationships
3.	Classification of coarse grained soils and corresponding laboratory tests
4.	Classification of fine grained soils and corresponding laboratory tests
5.	Calculation of stress distribution (static case)
6.	Basic relationships of seepage
7.	Calculation of stress distribution considering seepage
8.	Laboratory determination of permeability coefficient
9.	Deformation properties of soils
10.	Time dependency of soil compression, theory of primary consolidation
11.	Laboratory determination of deformation properties
12.	Shear strength of soils, Mohr Coulomb failure criterion
13.	Laboratory determination of shear strength parameters
14.	Summary, overview

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:

1. Mahler András: Soil mechanics

b) Online materials:

1. Lecture notes

2.6 Other information

2.7 Consultation

This Subject Datasheet is valid for:

Soil Mechanics - BMEEOGMAT42

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 tests.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
1. Midterm test	ZH1	A.1-A.2; B.1-B.2; C.3; D.1-D.2
2. Midterm test	ZH2	A.3; B.3; C.1-C.3; D.1-D.2
3. Midterm test	ZH3	A.4-A.5; B.4-B.5; 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
ZH1	30%
ZH2	30%
ZH3	40%
Sum	**100%**

The midterm tests are failed if the sum points of the test are less than the 50% of the obtainable points.

3.4 Requirements and validity of signature

There is no signature for this subject.

3.5 Grading system

Grade	Points (P)
excellent (5)	80<=P
good (4)	70<=P<80%
satisfactory (3)	60<=P<70%
passed (2)	50<=P<60%
failed (1)	P<50%

3.6 Retake and repeat

In case of failing the retake there is a possibility for second retake of one midterm test – after the payment of the fee determinated in the regulation – in the supplementary period.

3.7 Estimated workload

Activity	Hours/semester
Contact hours	14×4=56
Preparation for the courses	14×2=28
Preparation for the tests	3×6=18

Home studying of the written material	18
Sum	**120**

3.8 Effective date

1 September 2022

This Subject Datasheet is valid for:

2023/2024 semester I