Underground Structures, Deep Found. - BMEEOGMAS42

I. Subject Specification

1. Basic Data

1.1 Title

Underground Structures, Deep Found.

1.2 Code

BMEEOGMAS42

1.3 Type

Module with associated contact hours

1.4 Contact hours

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

1.5 Evaluation

Midterm grade

1.6 Credits

3

1.7 Coordinator

name	Dr. Zoltán TOMPAI
academic rank	Assistant professor
email	tompai.zoltan@emk.bme.hu

1.8 Department

Department of Engineering Geology and Geotechnics

1.9 Website

https://epito.bme.hu/BMEEOGMAS42
https://fiek2.mywire.org/course/view.php?id=433

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Compulsory in the Civil Engineering (BSc) programme

1.12 Prerequisites

Weak prerequisites:

- Foundation Engineering (BMEEOGMAT45)

1.13 Effective date

1 September 2017

2. Objectives and learning outcomes

2.1 Objectives

The scope of the subject is to teach the students the fundamentals of deep foundations and underground structures, including the brief history of piles and underground structures, different types of piles and piling technologies, other types of deep foundations, design of pile foundations, main types of underground structures, determination of the loads, the stresses and strains of the different underground structures.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. know the history of deep foundations
2. know the different type of piles, their installation and fields of applications
3. know the other types of deep foundations
4. know the loads acting on excavation support walls
5. know the loads acting on tunnels and underground structures
6. know the application fields any types of tunnels, underpasses and other types of underground structures
7. know the installation methods of different underground structures

B. Skills

1. be able to calculate the load bearing capacity of piles
2. be able to design basic deep foundation types
3. be able to determine the main dimensions, stresses and strains of underground structures

C. Attitudes

1. is cooperative with the teacher in gaining new knowledge
2. is continuously expanding his/her knowledge through learning
3. open to usage of new information technology methods/computer software
4. seeks to learn and routinely employ the design framework for problems of deep foundations and underground structures
5. strives for accurate task solving

D. Autonomy and Responsibility

1. individually assesses the design of pile foundations and basic deep excavation support structures
2. open to reasoned critical remarks
3. applies a systematic way of thinking

2.3 Methods

Lectures, practical classes, verbal and written communication

2.4 Course outline

Week	Topics of lectures and/or exercise classes
1.	Requirements, history of pile foundations, types of pile foundations
2.	Types of pile foundations, design of pile foundations
3.	Design of pile foundations, other types of deep foundations
4.	Earth pressures on vertical walls. Loads and design of deep excavation support walls
5.	Loads and design of deep excavation support walls
6.	Types of underground structures. Overview, main fields of applications
7.	Types of underground structures. Pedestrian underpasses
8.	Types of underground structures. Deep garages
9.	Types of underground structures. Highway and railway tunnels
10.	Types of underground structures. Utility tunnels
11.	Types of underground structures. Metro line and structures
12.	Basics of tunneling
13.	Loads and stresses of tunnels
14.	Summary

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

Online materials:

1. Deep foundations textbook (pdf)
2. Underground structures textbook (pdf)
3. Chang-Yu Ou: Deep Excavations (Theory and Practice)(pdf)
4. Theoretical lecture slides (pdf)
5. Practical lecture slides (pdf)

2.6 Other information

- Attendance on 70 % of theoretical and practical lectures is obligatory.

- Assignments completed in earlier semesters can be accepted with additional consultation of the lecturer.

2.7 Consultation

- The instructors are available for consultation during their office hours, as advertised on the department website or announced during lectures.
- Special appointments can be requested via email.

This Subject Datasheet is valid for:

Inactive courses

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 3 midterm tests and 2 assignments.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
1. midterm test	ZH1	A.1-A.3; C.1-C.5; D.1-D.3
2. midterm test	ZH2	B.1-B.3
3. midterm test	ZH3	A.4-A.7; C.1-C.5; D.1-D.3
1. assignment	HF1	B.1
2. assignment	HF2	B.2

- The dates of midterm tests and deadlines of assignments/homework is detailed on the first lecture and also can be found in the detailed course schedule on the subject's website.

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	Maximum points (P)
ZH1	15
ZH2	20
ZH3	15
HF1	25
HF2	25
Sum	**100**

- The midterm tests are failed if the sum points of the tests is less than the 40% of the obtainable points.
- In the second midterm test (ZH2) the minimum points should be reached for both test questions.

3.4 Requirements and validity of signature

There is no signature for this subject.

3.5 Grading system

Grade	Points (P)
excellent (5)	81 <= P
good (4)	69 <= P < 81
satisfactory (3)	55 <= P < 69
passed (2)	41 <= P < 55
failed (1)	P < 41

3.6 Retake and repeat

TESTS

1. All midterm tests can be retaken once free of charge.
2. In case of failing the retake described in point 3. there is a possibility for second retake – after the payment of the fee determinated in the regulation – in the supplementary period.
3. Only one midterm test can have a second retake.

ASSIGNMENTS

1. Assignments submitted can be corrected before final deadline free of charge.
2. Assignments submitted after the normal deadline announced on the first lecture can only be submitted after the payment of the fee determinated in the regulation.
3. The 2nd assignement (HF2) is only given to the student after he/she succesfully submitted the 1st assigment (HF1).
4. Latest submission deadline of the assignments is announced on the first lecture.

3.7 Estimated workload

Activity	**Hours/semester**
contact hours	14×3=42
preparation for the courses	8
preparation for the tests	3×8=24
preparation of the assignments	2×8=16
Sum	**90**

3.8 Effective date

11 May 2021

This Subject Datasheet is valid for:

Inactive courses