Engineering Works - BMEEOHSA-B3

I. Subject Specification

1. Basic Data

1.1 Title

Engineering Works

1.2 Code

BMEEOHSA-B3

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	2

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Dr. Kovács Tamás
academic rank	Associate professor
email	kovacs.tamas@emk.bme.hu

1.8 Department

Department of Structural Engineering

1.9 Website

https://epito.bme.hu/BMEEOHSA-B3
https://fiek2.mywire.org/course/view.php?id=2462

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Optional in the Civil Engineering (BSc) programme

1.12 Prerequisites

Strong prerequisites:

- Reinforced Concrete Structures (BMEEOHSAT43)
- Underground Structures, Deep Found. (BMEEOGMAS42)

Weak prerequisites:

- Bridges and Infrastructures (BMEEOHSAS43)

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The goal of the subject is to get to know the basic methods to for designing the engineering works. Special importance has the following questions of the monolithic construction technology: waterproofing, thermal loading modelling the long term deformations. Further goal is to master the modelling of interaction between soil and construction, the design specialities reinforced concrete base slabs and pipelines. The student has to master also the formation and construction methods of other engineering works as water basins, silos, bunkers, underground garages. The student gets knowledge about dynamic effects on tower-like constructions and the way of protection of the load bearing structure.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows the waterproof concrete,
2. knows the static performance of slabs on elastic foundation,
3. knows the limitation of works space by cutoff walls,
4. knows the basics of membrane theory and the static performance of bent shells,
5. knows the theory of silo pressure,
6. knows the design methods of tower-like constructions,
7. knows the dynamic effects and the wind induced effects on of tower-like constructions,
8. knows the tuned mass damping and its application.

B. Skills

1. is able to decide between solutions that ensure a water tightness of a concrete structure
2. is able to estimate the magnitude of the second order effects
3. is able can use the concept of metacentre,
4. is able to give an approximation for the critical load and the Eigen frequency of a complex structure by the using the summation formulas,
5. can conceptually define the differences between structural structures and evaluate their effectiveness,
6. is able to express his or her thoughts in an orderly manner in words and in writing.
7. delimits in the task of the load bearing structures the largely independent sub-tasks, and make them a priority,

C. Attitudes

1. endeavours for accurate and error-free workflow,
2. endeavours to use natural resources efficiently in the structures needed for society

D. Autonomy and Responsibility

1. uses the systemic approach in its thinking

2.3 Methods

Lectures, communication in writing and oral, use of IT tools and techniques, optional work independently and teamwork, work organization techniques.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	Civil engineering structures and their specialities
2.	Basics of theory of elastic plates, soil-supported structures
3.	Introduction to membrane theory. Circular shells
4.	Permeability of concrete, watertight concretes. Watertight coatings. Concreting in large volume.
5.	Structures for water supply and waste water systems. Design aspects for reinforced concrete liquid-retaining tanks.
6.	Reinforced concrete tanks at ground level: aspects of positioning, structural details, prestressing, tanks above rectangular and circular base. Pipe systems
7.	Stabilization of open building pits. Cut-off walls and soil anchors.
8.	Underground parking garages and parking buildings
9.	Concrete pavements
10.	Tunnels. Methods for improvement of soil stability. Excavation methods. Prefabricated and monolithic tunnels.
11.	Prefabricated and monolithic tunnels.
12.	Reinforced concrete water towers
13.	Bunkers, silos. Silo pressure theory. Damage to silos, reparation and strengthening of silos
14.	Special engineering structures. Telecommunication towers, industrial chimneys, cooling towers

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:

- Timoshenko: Theory of Plates and Shells, 1966
- Betonkalender 2006/1, Ernst & Sohn, 2006

b) Online materials:

- Electronic lecture notes on the homepage of the subject

c) Other literature:

- IITK-GSDMA: Guidelines for seismic design of liquid storage tanks, 2007

2.6 Other information

1. Attendance to lectures is compulsory. A student who has not participated in at least 70% of the lectures can not obtain the credit of the subject
2. Students are evaluated based on their individual performance.

2.7 Consultation

Consultation is available in given periods according to the website of the department. Furthermore, special appointments can be requested from the teachers via e-mail.

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 the results of the homework assignments and the written exam.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Homework#1 (partial evaluation)	HW1	A.1-A.2; B.1, B.5-B.7; C.1-C.2; D.1
Homework#2 (partial evaluation)	HW2	A.3-A.4; B.5-B.7; C.1-C.2; D.1
Homework#3 (partial evaluation)	HW3	A.5-A.7; B.2-B.7; C.1-C.2; D.1
Written examination (summary evaluation)	E	A.1-A.8; C.1-C.2; D.1

Assignment and submission dates of homework are included in the "Requirements for the subject" that is available on the website of the subject.
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
HW1	5%
HW2	13%
HW3	6%
Total achievable during the semester	**24%**
Exam	80%
Összesen	**104%**

Achievement of less than 50% of the total score for the exam results in a failed exam.

3.4 Requirements and validity of signature

To obtain signature at least 10 homework points (out of the total score of 24) need to be collected.

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

No delay or re-submission after deadline is allowed for homework assigments. Any homework assignment not

submitted until the associated submission deadline is excluded from valuation.

3.7 Estimated workload

Activity	**Hours/semester**
contact hours	14×2=28
homework	3×8=24
home studying of the written material	15
preparation for the examination	23
Sum	**90**

3.8 Effective date

1 September 2022

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2023/2024 semester I