Bridges and Infrastructures - BMEEOHSMI51

I. Subject Specification

1. Basic Data

1.1 Title

Bridges and Infrastructures

1.2 Code

BMEEOHSMI51

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. Budaházy Viktor
academic rank	Assistant professor
email	budahazy.viktor@emk.bme.hu

1.8 Department

Department of Structural Engineering

1.9 Website

https://epito.bme.hu/BMEEOHSMI51
https://fiek2.mywire.org/course/view.php?id=3495

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Compulsory in the Infrastructure Engineering (MSc) programme

1.12 Prerequisites

1.13 Effective date

2 February 2022

2. Objectives and learning outcomes

2.1 Objectives

The aim of the course is to provide the student with a comprehensive knowledge of the steel and reinforced concrete structures used in the field of infrastructure construction. The subject covers reinforced concrete and steel structures of hydraulic engineering structures, water and sewage storage and treatment pools and structures, structures on the ground, tunnels, underpasses, and road and railway bridges. The aim of the course is to acquaint students with the structural design, loads and construction issues of the works of art belonging to the above topics.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows the structural system of sluice and other hydraulic structures,
2. knows the structural system of liquid storage and treatment structures,
3. knows the structural system of elastically and elasto-plastically supported plates,
4. knows the types and structural systems of tunnel structurres,
5. knows the types and structural systems of underpass structures,
6. knows the types, construction and loads of road and rail bridges,
7. knows the the types and structural designs of communication and energy production tower structures.

B. Skills

1. is able to recognize the structural elements of engineering works of infrastruicture,
2. is able to make a scale sketch and name the parts of the above works.

C. Attitudes

1. is open for new knowledge, extend his/her knowledge by continuous acquisition of knowledge,
2. cooperates with the teacher and fellow students in expanding his/her knowledge,
3. force to understand the structural design of load-bearing structures,
4. open to the use of information technology tools,
5. try to solve the tasks and homeworks accurately,
6. attend on classes as a responsible member of the community.

D. Autonomy and Responsibility

1. independently performs the tasks assigned to him / her during the homework,
2. open for new knowledge,
3. use a systematic approach in his / her thinking.

2.3 Methods

Practice-oriented lectures focusing on the design of structures provide a starting point for the homework and exam.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	Steel structures of water managment
2.	Steel tower structures
3.	Reinforced concrete structures for hydraulic engineering
4.	Water and sewage storage and treatment structures
5.	Retaining wall
6.	Ground slab.
7.	Concrete pavements
8.	Tunnels.
9.	Underpasses.
10.	Loads of bridges.
11.	Substructures of bridges.
12.	Superstructures of bridges.
13.	Steel and composit bridges.
14.	Reinforced concrete bridges.

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 (hungarian and english):

- Palotás L. (szerk.) (1984) *Mérnöki Kézikönyv II.*, Műszaki Könyvkiadó, Budapest
- Timoshenko, S.P., Woinowsky-Krieger, S. (1966) *Lemezek és héjak elmélete,* Műszaki Könyvkiadó, Budapest
- Timoshenko, S.P., Gere, J.M (1963) *Theory of elastic stability*, McGraw-Hill Book Co., Singapore
- Márkus Gy. (1966) *Körszimmetrikus szerkezetek elmélete és számítása,*
- MSZ EN 1992-3 (2011) Eurocode 2 *Betonszerkezetek tervezése. Folyadéktartályok és tárolószerkezetek*, Magyar Szabványügyi Testület, Budapest
- Bölcskei E., Orosz Á. (1973) *Vasbeton szerkezetek. Héjak,* Tankönyvkiadó, Budapest
- Tóth L. (1984) *Vasbeton víztornyok tervezése és építése*, Mélyépterv, Budapest
- Keleti I. (szerk.) (2012) *Betonburkolatok*, Magyar Betonburkolat Egyesület, Budapest
- Huang, Y.H. (2003) *Pavement Analysis and Design*, Prentice Hall, ISBN 0131424734
- Liptay A. (2007) *Betonburkolatok hajlító-húzószilárdságának fáradása ismételt terhelés hatására*, tanulmány, www.betonopus.hu
- Bulletin 9 (2000) *Guidance for good bridge design*, fib, Lausanne
- Jankó L. (1998) *Vasbeton hídszerkeztek I., II.*, Műegyetemi Kiadó, Budapest
- *Bridge Construction Partner*, VSL Int. Ltd., Bern, 2008
- The C Range Post-tensioning System, Freyssinet, Vélizy-Villacoublay, 1999
- Chen, W-F., Duan, L. (2000) *Bridge Engineering Handbook*, CRC Press, Washington

- Mosztkov, V.M. (1978) *Nagyszelvényű föld alatti létesítmények*, Műszaki Könyvkiadó, Budapest
- ÚT 2-1.405 Útügyi Műszaki Előírás (2008) *Közúti alagutak létesítésének általános feltételei*, Magyar Útügyi Társaság, Budapest

b) Jegyzetek (in hungarian):

- Dr. Verőczi Béla: Vízépítési Acélszerkezetek, előadás jegyzet
- Hegedűs I. (-2013) *Talajon felfekvő szerkezetek; A rugalmas lemezelmélet alapfeltevései és alapösszefüggései; Vízzáró betonok, vízzáró vasbeton szerkezetek; Víztárolók; Víztornyok,* Egyetemi jegyzet, BME Hidak és Szerkezetek Tanszéke

c) Letölthető anyagok:

- Lecture slides
- Homework tutorilas

2.6 Other information

Attendance at lectures is mandatory. A student who attends less than 70% of the lectures may not earn credit for the subject.

2.7 Consultation

- Consultation dates: the dates and consultants are given in the Education Framework and homepage of the Department of Structural Engineering,
- or arrenged in email: budahazy.viktor@emk.bme.hu

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 described in 2.2 outcomes based on a homework and the result of a written exam.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Homework (summary performance evaluation)	HW	A.1-A.7; C.1-C.6; D.1-D.3
Exam (summary performance evaluation)	V	A.1-A.7; B.1-B.2; D.3

A szorgalmi időszakban tartott értékelések pontos idejét, a házi feladatok ki- és beadási határidejét a "Részletes féléves ütemterv" tartalmazza, mely elérhető a tárgy honlapján.
The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Jele	Részarány
HW	20%
Total achievable during the semester	**20%**
V	80%
Total	**100%**

You must get at least 10 points for homework. Exam score less than 50% of the available score results in Insufficient exam marks.

3.4 Requirements and validity of signature

The condition for obtaining the signature is that at least 10 points must be obtained from the homework. Anyone who does not take an examination course with a signature will overwrite the previous semester result with the result obtained in the given semester.

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

1. Homework is not mandatory and cannot be replaced.
2. Late homework is not included in the evaluation

3.7 Estimated workload

Tevékenység	**Óra/félév**
contact hours	14×2=28
preparation for class questions	26
Homework	18
elf-learning of the online material	18
Összesen	**90**

3.8 Effective date

2 February 2022

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Inactive courses