Mechanics of Masonry Structures - BMEEOTMDT81

I. Subject Specification

1. Basic Data

1.1 Title

Mechanics of Masonry Structures

1.2 Code

BMEEOTMDT81

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. Bagi Katalin
academic rank	Professor
email	bagi.katalin@emk.bme.hu

1.8 Department

Department of Structural Mechanics

1.9 Website

https://epito.bme.hu/BMEEOTMDT81
https://fiek2.mywire.org/course/view.php?id=2557

1.10 Language of instruction

hungarian and english

1.11 Curriculum requirements

Ph.D.

1.12 Prerequisites

1.13 Effective date

1 September 2022

2. Objectives and learning outcomes

2.1 Objectives

The course consists of two main parts. The first part introduces those methods that are particularly suitable for the analysis of masonry arches and vaults. The second part gives an overview on the most important types of masonry arches and vaults, with their typical crack patterns.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows what are the special features of masonry as a building material, in comparison to other types of construction materials (concrete, steel, etc)
2. understands the fundaments of graphical statics
3. knows how to analyse a system of solid bodies with the help of graphical statics
4. knows the most important graphostatic methods of masonry analysis
5. knows the main shell theories (membrane, Kirchhoff-Love, Mindlin-Reissner, higher order shear theories)
6. knows the two theorems of Limit State analysis and understands the limitations of their applications
7. knows what is a discrete element model and what are the main advantages and disadvantages of the different DEM techniques
8. knows what are the most important types of masonry vaults, how they carry and distribute their loads, and what are their typical crack pattern

B. Skills

1. is able to recognize the main types of vaults and arches;
2. is able to approximate the internal forces and the main crack patterns under selfweight for any of the considered vaults;
3. is able to select the most appropriate method that fits to the analysed problem;
4. is able to express his/her thoughts in an organized way in oral and written communication.

C. Attitudes

1. aims at learning and routinely using tools required for solving masonry mechanics problems,
2. aims at accurate and flawless problem solving

D. Autonomy and Responsibility

1. is able to individually think over masonry mechanics problems and to solve them using the given resources,
2. is open to valid criticism.

2.3 Methods

Lectures, oral and written communication, use of IT devices and techniques, optional practice problems solved individually and in teams (home practice).

2.4 Course outline

Graphic methods II.

Week	**Topics of lectures and/or exercise classes**
1.	Fundaments of masonry mechanics
2.	Graphic methods I.
3.	Graphic methods II.
4.	Shell theories
5.	Limit state analysis
6.	The Discrete Element Method
7.	Summary 1
8.	Arches
9.	Domes
10.	Barrel vaults and cross vaults
11.	Fan vaults
12.	Other types of vaults
13.	Students presentations
14.	Summary 2

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

Lecture slides for every class are available on the course website. Suggested literature can be found here.

2.6 Other information

Attendance at lectures is compulsory.
Students failing to prove to have attended at least 70% of the lectures based on their records of absences cannot obtain registry other than "Megtagadva" or "Nem teljesítette".
Students attending checks must not communicate with others during the check without explicit permission, and must not hold any electronic or other communication device switched on.

2.7 Consultation

The instructor is available for consultation in Teams or in personal presence. Special appointments can be requested via e-mail: bagi.katalin@emk.bme.hu .

This Subject Datasheet is valid for:

Mechanics of Masonry Structures - BMEEOTMDT81

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

The evaluation of learning outcomes described in Section 2.2. is based on two mid-term exams. The dates of the mid-term exams can be found in the "Detailed semester schedule" on the website of the subject.
A mid-term exam is successful if the scores reach or exceed 50%.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
1st mid-term exam	MT1	A.1-A.7
2nd mid-term exam	MT2	A.8; B.1-B.4; C.1-C.2; 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	50%
MT2	50%
Sum	**100%**

3.4 Requirements and validity of signature

To obtain a signature, all of the following requirements must be fulfilled:

- comply with the requirements on attendance, and
- both mid-term exams have to be successful.

3.5 Grading system

In the case of complying with the requirements on attendance, the results are determined as follows.
In the case of both mid-term exams being successful, the final result is computed by the weighted average points (P) of the two mid-term exams:

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

Both mid-term tests can once be retaken during the education period or during the repetition week. If one of the mid-term exams remains unsuccessful after the retake, one further retake can be done during the examination period. This option does not exist if both midterm exams remain unsuccessful by the end of the repetition week.

3.7 Estimated workload

Activity	**Hours/semester**
contact lessons	14×2=28
preparation for lessons during the semester	12×3=36
preparation for the check	2×13=26
Sum	**90**

3.8 Effective date

1 September 2022

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Inactive courses