Stone in structures - BMEEOGMDT82 - 2024/25/2

I. Subject Specification

1. Basic Data

1.1 Title

Stone in structures

1.2 Code

BMEEOGMDT82

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Lecture	3

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Ákos Török, DSc
academic rank	Professor
email	torok.akos@emk.bme.hu

1.8 Department

Department of Engineering Geology and Geotechnics

1.9 Website

http://epito.bme.hu/geotechnika-es-mernokgeologia-tanszek
https://edu.epito.bme.hu/course/view.php?id=2530

1.10 Language of instruction

english

1.11 Curriculum requirements

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1.12 Prerequisites

PhD education program

1.13 Effective date

5 September 2022

2. Objectives and learning outcomes

2.1 Objectives

Stones are widely used in engineering structures, and the main focus of this course is to understand the behaviour of stones in the built environment. Weathering phenomena and the long- and short-term changes of rock properties are outlined with special emphasis on alteration and deterioration of stones (igneous, sedimentary and metamorphic). Understanding the structural aspects, load bearing capacities and practicing visual assessment of stone structures is also the scope. On-site and laboratory testing of stones with standardized and non-standardized techniques are also discussed.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows the main lithotypes and their properties

2. knows the concept of mineral-rock and the importance of rock fabric

3. knows the main igneous rock types, their occurrence and their use in stone structures

4. knows the main sedimentary rock types their occurrence and their use in stone structures

5. knows the main metamorphic rock types their occurrence and their use in stone structures

6. knows the weathering features and diagnostics of stone structures

7. understand the durability of stones and the changes of physical properties

B. Skills

1. is able to identify and recognize rocks, describe them on site
2. is able to determine the most important weathering forms
3. capable of recognizing deterioration processes and interpreting them from an engineering perspective
4. suitable for carrying out local building stone diagnostic tasks and preparing an expert opinion
5. is able to express his thoughts in an orderly form orally and in writing

C. Attitudes

1. cooperates with the supervisor and fellow students during the expansion of knowledge
2. expands his knowledge by continuously acquiring knowledge
3. open to the use of technology tools
4. strives for accurate and error-free task solutions
5. strives to create harmony between geology and engineering sciences, to validate them in solving tasks

D. Autonomy and Responsibility

1. can independently determine the type of the given rock and think through the problems related to its properties and independently analyse it further based on given sources
2. takes into account the limitations of the knowledge of geological processes and the engineering design responsibility in predicting geological processes
3. accepts well-founded critical comments with an open mind
4. she/he uses the systemic approach in his thinking

2.3 Methods

Lectures, written and oral communication, use of IT tools and techniques.

2.4 Course outline

Week	**Topics of lectures and/or exercise classes**
1.	The topic of the subject is the methods of acquiring information on stone types
2.	Building materials of the earth's crust, minerals and rocks. The cycle of rock formation and its role of building stone occurrence
3.	Civil engineering aspects of stone structure description
4.	Plutonic igneous rocks in stone structures, their characterization, and their use in the construction industry

5.	Volcanic igneous rocks in stone structures, their characterization, and their use in the construction industry
6.	Pyroclastic igneous rocks in stone structures, their characterization, and their use in the construction industry
7.	Detrital sedimentary rocks in stone structures, their characterization, and their use in the construction industry
8.	Chemically/biologically precipitated sedimentary rocks in stone structures, their characterization, and their use in the construction industry
9.	Metamorphic rocks in stone structures, their characterization, and their use in the construction industry
10.	Weathering processes, physical/chemical/biological weathering forms
11.	Stone deterioration in the built environment.
12.	Lithological mapping of buildings, weathering and decay maps.
13.	On-site and laboratory tests of building stones of stone structures.
14.	Students' individual project works - presentations

Classes are held for 14 weeks. The basic programme for the 14 weeks (week per 3 hours)

The exact daily schedule will only be known the beginning of the period of Classes (on the first week)

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) Online materials

1. Electronic notes presented on the site

b) Books

1. Siegesmund, S. Snethlage, R. (eds) 2011. Stone in Architecture. Springer, Berlin, [DOI 10.1007/978-3-642-14475-2_2]

2. Přikryl R., Török Á. (eds.) 2010. Natural Stone Resources for Historical Monuments. Geological Society, London, Special Publications 333, 237p ISBN 978-1-86239-291-5.

2.6 Other information

2.7 Consultation

The instructors are available for consultation during their office hours, as advertised on the department website.

Special appointments can be requested via e-mail: torok.akos@emk.bme.hu

This Subject Datasheet is valid for:

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

There is an oral exam

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
study + presentation on the assigned area	HW	A.1-A.6; B.1-B.7; C.1-C.6; D.1-D.4
oral exam		B.1-B.7; C.1-C.3, C.5; D.2-D.4

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
Sum	**100%**

3.4 Requirements and validity of signature

Participation in 100 % of on-site

3.5 Grading system

Grade	Points (P)
excellent (5)	85<=P
good (4)	74<=P<84%
satisfactory (3)	62<=P<73%
passed (2)	50<=P<61%
failed (1)	P<50%

3.6 Retake and repeat

There is no retake

3.7 Estimated workload

Activity	**Hours/semester**
participation of site	14x2=28
mid-semester preparation for lessons	14x1=14
doing homework	20
independent learning of designated written curriculum	12
Sum	**74**

3.8 Effective date

5 September 2022

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