

COURSE SYLLABUS AND COURSE REQUIREMENTS

ACADEMIC YEAR 2025/2026 SEMESTER 1

<i>Course title</i>	DIAGNOSTICS OF STRUCTURES
<i>Course Code</i>	MSM410AN
<i>Hours/Week: le/pr/lab</i>	2/0/1
<i>Credits</i>	3
<i>Degree Programme</i>	Structural Engineering MSc
<i>Study Mode</i>	Full time
<i>Requirements</i>	Med-term grade
<i>Teaching Period</i>	Fall semester (1)
<i>Prerequisites</i>	
<i>Department(s)</i>	Department of Civil Engineering
<i>Course Director</i>	Dr. Zoltan Orban
<i>Teaching Staff</i>	Dr. Zoltan Orban, Dr. Andras Dormany, Dr. Attila Fulop

COURSE DESCRIPTION

This course is aimed to provide advanced knowledge on the principles of the inspection, diagnostics and structural analysis for assessment of existing structures. Topics covered by the course include: reliability requirements of existing structures, visual inspections, destructive and non-destructive test methods, combination of test methods, evaluation of test data, reliability assessment of existing structures based on in-situ test results, monitoring methods.

SYLLABUS

1. GOALS AND OBJECTIVES

The aim of this course is to provide general knowledge about inspection, diagnostics and monitoring of engineering structures. Students will gain from this course:

- Knowledge on the principles of diagnostics, monitoring and structural analysis of existing civil engineering structures,
- Overview on specific destructive and non-destructive methods of structures built from various construction materials.

2. COURSE CONTENT

TOPICS

LECTURE

1. Principles of inspection, analysis and assessment of existing structures.
2. Destructive test methods.
3. Non-destructive test methods.
4. Geophysical test methods.
5. Monitoring methods.
6. Case studies.

PRACTICE

1. Practical use of destructive test method.
2. Practical use of non-destructive and geophysical test method.
3. Laboratory demonstrations.

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

<i>week</i>	Topic	Compulsory reading	Required tasks	Completion date
1	Introduction.			

2	Principles of inspection, analysis and assessment of existing structures.	[1], [3], [4]		
3	Visual inspections. Case studies.	[1]		
4	Destructive test methods. Strength tests on concrete.	[1], [2]		
5	Non-destructive test methods I.	[1], [2], [3]		
6	Non-destructive test methods II.	[1], [2], [3]		
7	Geophysical test methods.	[1], [2], [2]		
8	<i>Break</i>			
9	Monitoring methods.	[1]		
10	Monitoring methods II.	[1]		
11	Case studies.	[1]		
12	Student's presentations /Assignment 1/		Assignment	24 November
13	Exam		Exam	1 December
14	Student's presentations, re-take exam		Re-take exam	8 December

PRACTICE, LABORATORY PRACTICE

week	Topic	Compulsory reading	Required tasks	Completion date,
1	Orientation. Introduction.			
2	Laboratory demonstrations			
3	Visual inspections. Geometrical measurements. Point-cloud based measurements.	[1]		
4	Destructive test methods	[1]		
5	Non-destructive test methods in practice I.	[1]		
6	Non-destructive test methods in practice II.	[1]		
7	Geophysical test methods in practice.	[1]		
8	<i>Break</i>			
9	Monitoring methods.	[1]		
10	Monitoring methods in practice.	[1]		
11	Consultation.			
12	Submit assignment 2		Assignment 2	24 November
13	Consultation.			
14	Submit assignment 2(corrections)			8 December

3. ASSESSMENT AND EVALUATION

Attendance

Absences from lectures and practical sessions during the semester must not exceed 30%.

Method for monitoring attendance

Attendance sheet

ASSESSMENT

Course resulting in mid-term grade (PTE TVSz 40§(3))

Mid-term assessments, performance evaluation and their ratio in the final grade (The samples in the table to be deleted.)

Type	Assessment	Ratio in the final grade
Assignment 1: Essay or test report	max 25 points	25 %
Assignment 2: Presentation	max 25 points	25 %
Exam test	max 50 points	50 %

Opportunity and procedure for re-takes (PTE TVSz 47§(4))

On the 13th week and the first two week of the exam period, you can re-take or correct the exam once.

Grade calculation as a percentage

based on the aggregate performance according to the following table

Course grade	Performance in %
excellent (5)	85 % ...
good (4)	70 % ... 85 %
satisfactory (3)	55 % ... 70 %
pass (2)	40 % ... 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

4. SPECIFIED LITERATURE

COMPULSORY READING AND AVAILABILITY

[1] Presentation materials in digital format /downloadable/

RECOMMENDED LITERATURE AND AVAILABILITY

[2] M Raupach, Till Büttler: Concrete Repair to EN 1504 - Diagnosis, Design principles and Practice, CRC Press, ISBN-13: 978-1-4665-5746-8

[3] ISO 13822: 2010 „Bases for design of structures — Assessment of existing structures”

[4] ISO 2394: 2015 „General principles on reliability for structures”