COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR 2024/2025 SEMESTER 1

Course title	*STRENGTHENING OF STRUCTURES*
Course Code	***MSB392AN***
Hours/Week: le/pr/lab	2/1/0
Credits	3
Degree Programme	Civil Engineering BSc
Study Mode	*Full time*
Requirements	Med-term grade
Teaching Period	Fall semester (7)
Prerequisites	
Department(s)	*Department of Civil Engineering*
Course Director	Dr. Zoltan Orban
Teaching Staff	András Dormány

COURSE DESCRIPTION

This course is aimed to provide basic knowledge on the principles of the repair and strengthening of structures constructed from various types of materials. Topics covered by the course include: assessment of structures, deterioration of structural materials and structures, basic principles of structural repair and strengthening, concrete and masonry repairs, methods of strengthening steel, concrete and timber structures, introduction of specific technologies such as strengthening with shotcrete, strengthening with fibre reinforced plastics (FRP), near surface reinforcing systems, design examples and case studies on strengthening bridges, buildings and other civil engineering structures.

SYLLABUS

1. GOALS AND OBJECTIVES

The aim of this course is to provide general knowledge about strengthening of engineering structures.
Students will gain from this course:

- Basic knowledge on the principles of repair and strengthening of civil engineering structures,
- Understanding some of the deterioration processes of structural materials and structures,
- Overview on specific repair and strengthening methods of structures built from various construction materials.

2. COURSE CONTENT

	TOPICS
LECTURE	1. Principles of strengthening and repair. 2. Deterioration and repair of concrete and reinforced concrete structures 3. Strengthening with FRP materials 4. Repair and strengthening of masonry structures 5. Strengthening of steel and timber structures 6. Strengthening of foundations
PRACTICE	1. Strengthening of concrete structures with FRP materials 2. Strengthening of masonry structures 3. Design assignment

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	Topic	Compulsory reading	Required tasks	Completion date
1	Orientation.			
2	Basic terms. Principles of strengthening and repair.			
3	Deterioration and repair of concrete and reinforced concrete structures I.	[1], [5]		
4	Deterioration and repair of concrete and reinforced concrete structures II.	[1], [4], [5]		
5	Strengthening with FRP materials I.	[1], [3]		
6	Strengthening with FRP materials II.			
7	Repair and strengthening of masonry structures.	[1], [3], [4]		
8	*National holiday /class is cancelled/*			
9	Strengthening of steel and timber structures	[1] [4]		
10	Strengthening of foundations.	[1] [4]		
11	Student's presentations /Assignment 2/		Assignment 3	11 November
12	Exam		Exam	18 November
13	Student's presentations, re-take exam		Assignment 3	25 November

PRACTICE, LABORATORY PRACTICE

week	Topic	Compulsory reading	Required tasks	Completion date,
1	Orientation.			
3	Principles of strengthening and repair, in practice	[1], [4]		
5	Strengthening of concrete structures with FRP materials I. /Beam/	[2], [3]		
7	Strengthening of concrete structures with FRP materials II./Column/	[2], [3]		
9	Consultation.			
11	Consultation.			
13	Submit assignments 1. and 2.		Assignment 1 Assignment 2	25 November

3. ASSESSMENT AND EVALUATION

Attendance

Absences from lectures and practical sessions during the semester must not exceed 30%. Absences can be justified by a medical certificate from the University's GP.

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: Design Task 1.	*max 25 points*	***25 %***
Assignment 2: Design Task 2.	*max 25 points*	***25 %***
Assignment 3: Presentation	*max 10 points*	***10 %***
Exam test	*max 40 points*	***40 %***

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

On the 13th week and during the first two week of the exam period, you can re-take or correct the final 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/

[2] Practical guides /downloadable/

RECOMMENDED LITERATURE AND AVAILABILITY

[3] Externally bonded FRP reinforcement for RC structures, fib Bulletin 14., 2001.

[4] "Case Studies of Rehabilitation, Repair, Retrofit and Strengthening of Structures", ISBN 978-3-85748-124-6

[5] EN 1504 European standard series