COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR 2023/2024 SEMESTER 2

Course title	*Strength of Materials*
Course Code	*MSB110ANEP*
Hours/Week: le/pr/lab	*2 / 4 / 0*
Credits	*7*
Degree Programme	*BSc Civil Engineering*
Study Mode	*full time*
Requirements	*exam grade*
Teaching Period	*2nd semester*
Prerequisites	*MSE256ANEP Mechanics 1. (Statics)*
Department(s)	*Department of Civil Engineering*
Course Director	*Dr. Attila FÜLÖP associate professor*
Teaching Staff	*Dr. Attila FÜLÖP associate professor*

COURSE DESCRIPTION

Students continue to learn the fundamentals of mechanics, compression and stressing of bar structures, which helps them with dimensioning basic structural components of construction and selecting the most appropriate materials. To assist with this, students learn the rules of technical and building constructional representations and various structural systems.

SYLLABUS

1. GOALS AND OBJECTIVES

In particular, students cover the following topics: stress and deformation, Hooke's Law, axial pre-stressing and compression of bar structures, pure shear, design of bolted joints, wooden joints, bending stress, perpendicular and oblique bending, shear stresses with simultaneous bending, eccentric stresses of materials with and without tension strength, stress and deformation states, Hooke's Law, shear stresses with simultaneous bending, eccentric stresses of materials with and without tension strength, stability of compressed members - buckling, virtual forces and deflections, potential energy laws.

2. COURSE CONTENT

	TOPICS
LECTURE AND PRACTICE	1. *Introduction. Geometrical properties. Centroid, first and second moments of inertia. Product of inertia, principal directions.* 2. *Stresses. Principal stresses. Mechanical properties of materials. Strains. Normal strain, shear strain, cartesian strain components. Transverse contraction.* 3. *Normal stresses in case of axial loading. Mechanical properties of materials. Stress-strain diagrams. Elastic and plastic behaviour. Hooke's law. Design of cross sections.* 4. *Shear stresses in case of simple shear. Bolted joints in single and double shear. wooden joints.* 5. *Pure torsion, simple and coupled bending* 6. *Shear stresses with simultaneous bending, Zhuravskiy's formula.* 7. *Eccentric stresses of materials with and without tension strength* 8. *Stability of compressed members - buckling.* 9. *Stress and deformation states* 10. *Virtual forces and deflections* 11. *Calculations of deformations of beams* 12. *Potential energy laws* 13. *Exam*

DETAILED SYLLABUS AND COURSE SCHEDULE

LECTURE AND PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Introduction. Geometrical properties. Centroid, first and second moments of inertia. Product of inertia, principal directions.	[1] [2]		
2.	Stresses. Principal stresses. Mechanical properties of materials. Strains. Normal strain, shear strain, cartesian strain components. Transverse contraction.	[1] [2]		
3.	Normal stresses in case of axial loading. Mechanical properties of materials. Stress-strain diagrams. Elastic and plastic behaviour. Hooke's law. Design of cross sections.	[1] [2]		
4.	Shear stresses in case of simple shear. Bolted joints in single and double shear. wooden joints.	[1] [2]	HW1	
5.	Pure torsion, simple and coupled bending	[1] [2]		
6.	Shear stresses with simultaneous bending, Zhuravskiy's formula.	[1] [2]		
7.	Eccentric stresses of materials with and without tension strength. Stability of compressed members - buckling.	[1] [2]		
8.	Midsemester Exam		HW2	
9.	Spring holiday			
10.	Stress and deformation states	[1] [2]		
11.	Virtual forces and deflections	[1] [2]		
12.	Calculations of deformations of beams	[1] [2]		
13.	Potential energy laws	[1] [2]		
14.	Endsemester Exam		HW3	

PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Introduction. Geometrical properties. Centroid, first and second moments of inertia. Product of inertia, principal directions.	[1] [2]		
2.	Stresses. Principal stresses. Mechanical properties of materials. Strains. Normal strain, shear strain, cartesian strain components. Transverse contraction.	[1] [2]		
3.	Normal stresses in case of axial loading. Mechanical properties of materials. Stress-strain diagrams. Elastic and plastic behaviour. Hooke's law. Design of cross sections.	[1] [2]		
4.	Shear stresses in case of simple shear. Bolted joints in single and double shear. wooden joints.	[1] [2]	HW1	
5.	Pure torsion, simple and coupled bending	[1] [2]		

6.	Shear stresses with simultaneous bending, Zhuravskiy's formula.	[1] [2]		
7.	Eccentric stresses of materials with and without tension strength. Stability of compressed members - buckling.	[1] [2]		
8.	Midsemester Exam		HW2	
9.	Spring holiday			
10.	Stress and deformation states	[1] [2]		
11.	Virtual forces and deflections	[1] [2]		
12.	Calculations of deformations of beams	[1] [2]		
13.	Potential energy laws	[1] [2]		
14.	Consultation, Endsemester Exam		HW3	

3. ASSESSMENT AND EVALUATION

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance

attendance sheet

ASSESSMENT

Course-unit with final examination

Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam

Type	Assessment	*Weighting as a proportion of the pre-requisite for taking the exam*
1. *Midsemester Exam*	*max 30 points*	*30 %*
2. *Endsemester Exam*	*max 30 points*	*30 %*
3. *homework 1-2-3*	*max 3 × 10 points*	*30 %*
4. *attendance*	*max 10 points*	*10 %*

Requirements for the end-of-semester signature

mid-term assessment of 40%

Re-takes for the end-of-semester signature (PTE TVSz 50§(2))

The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

The Midsemester and Endsemester Exam can be retake once, if it not reaches the min 40%. The homeworks can be resubmit ones within the given deadline, if they not reach the min 40%.

Type of examination *(written, oral):* *written*

The exam is successful if the result is minimum 40 %.

Calculation of the grade *(TVSz 47§ (3))*

The mid-term performance accounts for ***50*** %, the performance at the exam accounts for ***50*** %, in the calculation of the final grade.

Calculation of the final grade based on aggregate performance in percentage.

Course grade	Performance in %
excellent (5)	85 % – 100%
good (4)	70 % – 84%
satisfactory (3)	55 % – 69%
pass (2)	40 % – 54%
fail (1)	0 % – 39%

4. SPECIFIED LITERATURE

COMPULSORY READING AND AVAILABILITY

[1.] Electric material in TEAMS

[2.] Russel C. Hibbeler, Mechanics of Materials (9th Edition), ISBN-13: 978-0133254426

RECOMMENDED LITERATURE AND AVAILABILITY

[3.] Wight, J. K, MacGregor J. Reinforced concrete mechanics & design, Pearson, 2012.

[4.] Riley, Mechanics of Materials, ISBN-13: 978-0471705116