General Information:

Name of Course: # MECHANICS 2 (MECHANICS MATERIALS)

Course Code: PMKSTNE043CA
Semester: 2nd
Number of Credits: 7
Allotment of Hours per Week: 2 Lectures + 4 practical classes /Week
Evaluation: Signature (with grade)
Prerequisites: **Mechanics 1 (Statics)**

Instructor: **Dr. Attila FÜLÖP**
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Introduction, General 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.

Learning Objectives:

In particular, students cover the following topics: stress and deformation, Hookes Law, axial prestressing 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, issues of design and examination, EUROCODE's and Hungarian standards. Virtual forces and deflections. Potential energy laws.

Methodology:

- **Lectures**: will give an introduction to the basic knowledge of the design of the mechanics materials.
- **Practical class**: Students will be able to practice the basic calculations and design through sample examples.
- **Exams:** Accumulated knowledge is tested in three exams: two midterm exams, and a final exam.

Schedule:

Week	Topic of lecture
Week 1	Course description. Orientation.
Week 2	Centroid, first and second moments of inertia. Product of inertia, principal directions. Introduction. Geometrical and material properties.
Week 3	Stresses. Principal stresses. Average normal and shear stresses in case of axial loading, and simple shear.

Week 4	Bolted joints in single and double shear. wooden joints. Strains. Normal strain, shear strain, cartesian strain components. Transverse contraction. Mechanical properties of materials.
Week 5	Elongations, distortions transverse contractions.
Week 6	Mechanical properties of materials. Stress-strain diagrams. Elastic and plastic behaviour. Hooke's law. Design of cross sections.
Week 7	Simple bending, torsion
Week 8	**Midterm exam 1** Stresses of beams.
Week 9	*Spring break – no classes*
Week 10	Stresses of beams. Zhuravskiy formula. Stability of compressed members. Buckling.
Week 11	Virtual forces and deflections
Week 12	**Midterm exam 2** Calculations of deflections of beams
Week 13	Potential energy laws I.
Week 14	Potential energy laws II.
Week 15	**Final exam**

Attendance:

Attending is required all classes, and will impact the grade (max. 10%). Unexcused absences will adversely affect the grade, and in case of absence from more than 30% of the total number of lesson will be grounds for failing the class. To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 20 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

Grading:

10% - Attendance
30% - Midterm Exam I.
30% - Midterm Exam II.
30% - Final Exam

Grade:	5	4	3	2	1
Evaluation in percents:	85%-100%	74%-84%	63%-73%	51%-62%	0-50%

Students with Special Needs:

Students with a disability and needs to request special accommodations, please, notify the Deans Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

Readings and Reference Materials:

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

• Wight, J. K, MacGregor J. Reinforced concrete mechanics & design, Pearson, 2012.

• Riley, Mechanics of Materials, ISBN-13: 978-0471705116

• http://www.me.mtu.edu/~mavable/Book/Entire%20Book.pdf