University: University of Žilina	
Faculty: Faculty of Mechanical Engineering	
Course ID: 2Y006	**Course name:** Mechanics of Materials I
Course obligation: Compulsory **Completion:** Exam	
Profile course: yes **Core course:** yes	
Form, extent and method of teaching activities:	
Number of classes per week in the form of lectures, laboratory exercises, seminars or clinical practice	Lectures: 2 classes Seminars: 3 classes Lab.exercises: 0 classes
Methods by which the educational activity is delivered	Present form of education
Applied educational activities and methods suitable for achieving learning outcomes	**Lectures:** lectures with problem interpretation, definition of basic principles, solution of sample examples, comment on the solution, interactive lectures with discussion, lectures with multimedia support, connection to technical practice **Exercises:** practical application of the material from the lectures, solving problem tasks with a connection to technical practice, demonstration methods, repetition of learned issues, ongoing written examination, discussion for feedback from students Students have the possibility of individual consultations with all teachers of this subject.
Number of credits: 7	
Study workload: 130 hours;	
Recommended semester/term of study: summer, 2. year	
Study degree: 1	
Required subsidiary courses: Prerequisites: Co-requisites:	
Course requirements: **Continuous assessment / evaluation:** Active participation in exercises, passing the test, respectively. written work. **Final assessment /evaluation:** Evaluation of activities and work during the semester based on the evaluation of the instructor (40%) + evaluation on the exam - theoretical and practical part (60%) **Resulting subject classification:** Grade A: minimum 93 points Grade B: minimum 85 points Grade C: minimum 77 points Grade D: minimum 69 points Rating E: minimum 61 points FX rating: less than 61 points To enroll for an exam the student must have at least 20 points.	

Forms and methods of assessment	Predetermined weight %	Area of knowledge, skills and competence
1-2 intermediate tests	20 %	Professional knowledge
presentation and active participation in exercises	10 %	Presentation skills, professional knowledge, working with information, ability to solve a problem independently
student portfolio	10 %	Professional knowledge, work with various information sources, self-study, ability to discuss and defend the achieved results, individual/team work
exam (test/written part + interview)	60 %	Professional knowledge - theoretical and practical written part, presentation and defense of the written part, discussion

Course outcomes:

The aim is to teach students to solve simple and more complex tasks of Elasticity and Strength. Analysis of elements stressed by axial load, torsion, bending and their combination, solving of body deformation and ability to dimension elements of mechanical structures.

Course scheme:

1. Basic principles of Elasticity and Strength. Basic concepts, laws and simplifications in elasticity and strength, internal and external loads, cut method, internal force effects, stress-strain diagram, Hooke's law for tension / compression and shear, Poisson number.
2. Stress and strain analysis, uniaxial, biaxial and triaxial stress, Mohr's circles for planar and spatial stress, extended Hooke's law, Castiglian theorems, stress analysis.
3. Axially loaded elements of mechanical structures. Tensile / compressive stress, axial forces, normal stresses, deformation under axial stress.
4. Solution of statically definite and indeterminate elements subjected to axial load, dimensioning under tension / compression.
5. Bar systems. Solution of deformation in bar systems, solution of statically definite and indeterminate bar systems.
6. Twist of shafts with circular and cross-section. Torques, shear stresses, cross-sectional module in torsion, torsional deformation, torsion angle.
7. Solution of statically certain and indeterminate elements subjected to torsion, dimensioning during torsion.
8. Plane bending of beams. Internal force effects, transverse force and bending moment, Schwedler theorems, normal and shear stresses, dimensioning at bending.
9. Deformation at bending. Bernoulli diffraction curve equation, boundary conditions, energetic methods, Castiglian theorems, method of initial parameters.
10. Solution of statically certain and indeterminate beams subjected to bending.
11. Curved and angled beams, stress and strain solution, dimensioning.
12. Combined stress, strength theory for combined stress.
13. Supplementing the curriculum and replacing lectures missed due to public holidays, consultations before the exam.

Literature:

1. Sága, M., Vaško, M., Kopas, P.: Pružnosť a pevnosť – vybrané metódy a aplikácie. VTS pri ŽU v Žiline, 2011, 400 s., ISBN 978-80-89276-34-9
2. Cúth, V., Sága, M., Toth, Ľ.: Pružnosť a pevnosť I – Príklady. EDIS pri ŽU v Žiline, 1999
3. Trebuňa, F., Šimčák, F., Jurica, V.: Pružnosť a pevnosť I. VIENALA, Košice, 2000
4. Hibbeler, R.C.: Mechanics of Materials. Tenth edition in SI units, Pearson, 2018, 892 p., ISBN 1-292-17820-5

Instruction language: english

Notes:

Course evaluation:

Total number of evaluated students: 3

A	B	C	D	E	FX
0.00 %	0.00 %	66.67 %	0.00 %	33.33 %	0.00 %

Course teachers:

Lecture: prof. Ing. Milan Sága, Dr. Lecture: doc. Ing. Milan Vaško, PhD. Seminar: Ing. Peter Kopas, PhD. Seminar: doc. Ing. Milan Vaško, PhD.
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Approved by: prof. Ing. Milan Sága, Dr.