University: University of Žilina	
Faculty: Faculty of Mechanical Engineering	
Course ID: 2Y017	**Course name:** Mechanics of Materials II
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: 6	
Study workload: 130 hours;	
Recommended semester/term of study: winter, 1. year	
Study degree: 2	
Required subsidiary courses: Prerequisites: Co-requisites:	
Course requirements: **Continuous assessment / evaluation:** active participation in exercises, control test during the semester, respectively. semestral project. **Final assessment /evaluation:** Evaluation of activities and work during the semester based on the evaluation of the instructor (40% = 40 points) + evaluation on the exam - theoretical and practical part (60% = 60 points). **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:

By completing the subject Mechanics of Materials II, the student will be able to:
- apply knowledge from professional subjects of the 1st degree of higher education in an extended form and apply them to solving more complex problems,
- know and understand the basic principles of solving relationships and regularities in Flexibility and plasticity,
- derive, compile and use the necessary relationships, apply your professional knowledge to solve more complex and specific tasks of technical practice (tension and deformation of rotationally symmetric structural elements, twisting of non-circular cross-sections, geometric and material nonlinearities, loss of stability of slender rods, plasticity criteria, etc.) ,
- analyze the elements of machine structures stressed by axial load, twisting, bending and their combination, solve the state of tension and deformation of bodies and dimension the elements of machine structures using the theory of plasticity,
- using the acquired knowledge to apply methods and hypotheses of strength, theories of plastic creep and plastic deformations, based on the analysis of the problem to recognize the appropriateness of using individual methods, hypotheses and theories and to use them independently,
- analyze, describe, evaluate, document and defend the obtained results, create a final evaluation independently and in a team and express generalized conclusions and assess and propose the applicability of the obtained results to specific problems of technical practice.

The aim of the subject is to expand knowledge from the subject Elasticity and strength 1. The content of the subject is the presentation of the most modern theories and other methods and procedures for the analysis of elements and structures, especially from the point of view of stresses above the yield point and prediction of fatigue damage. Emphasis is placed on solving problems of technical practice and interpreting the results. The acquired knowledge can be used in all engineering disciplines and forms a strong basis for further study of mechanics and further active expansion of acquired professional knowledge.

Course scheme:

- Spatial loading of beams.
- Torsion bars of non-circular cross-section.
- Analysis of selected rotationally symmetric problems:
  - thick-walled containers,
  - rotating parts of machines and mechanisms.
- Basic equations of continuum mechanics.
- Geometric nonlinearity, kinematics of deformation motion, Green-Lagrange relations.
- Loss of stability of slender bars, basic cases of strut.
- Material non-linearity, theory of plastic creep and plastic deformation, material models, plasticity criteria.
- Permanent fatigue strength and time limited fatigue life, fatigue life criteria, design for material fatigue.

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: 52

A	B	C	D	E	FX
21.15 %	9.62 %	17.31 %	9.62 %	42.31 %	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.