COURSE DESCRIPTION CARD - SYLLABUS

Course name

Strength of materials

Course

Field of study

Aviation

Year/Semester

2/4

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

30

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Solving basic problems of technical mechanics.

Solving statically determinate problems of strength of materials.

Ability to search for necessary information in literature, databases, catalogues. The ability to self-study.

Using information and communication techniques appropriate to carry out engineering tasks.

Course objective

Introduction to the basic principles of mechanics of deformable bodies.

Course-related learning outcomes

Knowledge

1. has extended knowledge in the field of material strength, including the theory of elasticity and plasticity, stress hypotheses, methods of calculating beams, membranes, shafts, joints and other structural elements, as well as methods of testing the strength of materials and the state of deformation and stress in structures, and has basic knowledge of the main departments of technical mechanics: statics, kinematics and dynamics of a material point and a rigid body

2. has basic knowledge of metal, non-metal and composite materials used in machine construction, in particular about their structure, properties, methods of production, heat and thermo-chemical treatment and the influence of plastic processing on their strength, as well as fuels, lubricants, technical gases, refrigerants e.t.c.

Skills

1. is able to organize, cooperate and work in a group, assuming various roles in it, and is able to properly define priorities for the implementation of a task set by himself or others

2. is able to plan and implement the process of own permanent learning and knows the possibilities of further education (2nd and 3rd degree studies, postgraduate studies, courses and exams conducted by universities, companies and professional organizations)

Social competences

1. understands that in technology, knowledge and skills very quickly become obsolete

2. is aware of the social role of a technical university graduate, in particular understands the need to formulate and provide the society, in an appropriate form, with information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the engineer profession

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Lecture - written test and assessment of activity in the classroom:

3 50.1% -70.00%

4 70.1% -90.0%

5 from 90.1%

Programme content

Tension and compression within the limits of elasticity, the statically indeterminate bar systems.

Basics of strength calculations in the plastic range.

Torsion of thin-walled bars.

Shear stresses in beams.

Beam Design. Generalized Clebsch method (Macauley's method).

Statically indeterminate beams.

PART - 66 (THEORY - 11.25 hours)

MODULE 6. MATERIALS AND EQUIPMENT

6.2 Non-ferrous aircraft construction materials

b) Testing of non-ferrous materials for hardness, toughness

tensile strength, fatigue strength and impact strength. [1]

Statically indeterminate beams.

Teaching methods

Live lecture with multimedia illustrations and examples of solutions.

Bibliography

Basic

1. J. Zielnica, Wytrzymałość materiałów, str. 554, WPP, wyd. III, Poznań 2000

2. Z. Dyląg, A. Jakubowicz, Z. Orłoś, Wytrzymałość materiałów, WNT, Warszawa, 2012

3. K. Magnucki, W. Szyc, Wytrzymałość materiałów w zadaniach, PWN, 1987

Additional

1. N. Willems, T. J. Easley, S. T. Rolfe, Strength of Materials, Mc Graw-Hill Book Company, 1981

2. M. Gere, S. Timoshenko, Mechanics of Materials, PWS-Kent Publishing Company, Bos-ton, 1984

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	47	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests) [1]	53	2,0

[1] delete or add other activities as appropriate