



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Strength of materials

Course

Field of study

Transport

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

Tutorials

30

Projects/seminars

Other (e.g. online)

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3 Street, 60-965 Poznan

Responsible for the course/lecturer:

Prerequisites

The knowledge in range of physics, mechanics, the basics of mathematical analysis and planimetry.

Course objective

1. Present the basic knowledge in range of mathematical methods of description the material strength and simple construction elements like shafts and beams.
2. Developing students' skills in modeling simple physical phenomena arising as a result of loading the structure or their elements and their mathematical description.
3. Developing the skill of practical interpretation of the obtained results, important from a practical point of view.
4. Developing teamwork skills in students.



Course-related learning outcomes

Knowledge

The student has an extended and deepened knowledge of mathematics useful for formulating and solving complex technical tasks concerning various means of transport

The student has extended and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modeling of real problems

The student has a basic knowledge of the life cycle of means of transport, both equipment and software, and in particular about the key processes occurring in the product life cycle

Skills

Student is able, when formulating and solving tasks in the field of transport, to apply appropriately selected methods, including analytical, simulation or experimental methods

Social competences

The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam (lecture part) - theoretical questions about the issues presented in the lectures:

50.1%-70.0% (3) ; 70.1%-90.0% (4) ; from 90.1% (5)

Assessment of tests - exercise part:

50.1%-70.0% (3) ; 70.1%-90.0% (4) ; from 90.1% (5)

Assessment of activity in the classroom - creativity in solving problems:

50.1%-70.0% (3)- moderate activity

70.1%-90.0% (4)- high activity (involvement in the search for a solution to the given problem)

od 90.1% (5) - very high activity (searching in the literature for other ways to solve the given problem)

Programme content

1. Distribution and definitions of loads, definitions of stresses, differential equations of stress equilibrium for the material continuum.
2. Flat state of stress – determining of principal directions and stresses by the using of analytical (Mohr's circle) and graphic methods.
3. Relations between the vector field of displacements and the tensor field of strains.
4. Pure shear state, generalized Hooke's law



5. Moments of inertia of plane figures.
6. Elementary theory of torsion - cross-sectional torsional strength index.
7. Bending theory.
8. Strength hypothesis - the assesment of the strength of material under complex load state.

Teaching methods

Lecture and exercises

Bibliography

Basic

1. Wytrzymałość materiałów, J. Zielnica WPP 2001
2. Wytrzymałość materiałów T., M. Niezgodzińscy
3. Zbiór zadań z wytrzymałości materiałów F. Twardosz

Additional

1. Bielajew, Wytrzymałość materiałów, wydawnictwo MON 1956

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	45	1,5

¹ delete or add other activities as appropriate