COURSE DESCRIPTION CARD - SYLLABUS

Course name
Strength of materials

Course

Field of study
Technical Physics

Year/Semester
2/3

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
30

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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Faculty of Mechanical Engineering

Piotrowo 3 Street, 60-965 Poznan

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Prerequisites

The knowledge ir range of phisics, mechanics, the basics of mathematical analysis and planimetry. The ability to solving of simple problems in range of mechanic, mathematic, observation and deduction, the ability to search for information from the indicated sources. The understanding of the necessity to wideing of the own competences, readiness to cooperate in a team.

Course objective

1. Present the basic knowledge in range of mathematical methods of description the material strength and simple construction elemnts 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

As a result of the conducated classes, the student:

1. has an orderly knowledge of the stregth of material [K1_W07].

2. knows the assumptions and application area of the most important analytical models used to describe the basic physical phenomena in the field of material strength [K1_W01, K1_W07].

3. has knowledge of solving simple strength problems by the using of the analytical method [K1_W01, K1_W03].

Skills

As a result of the conducated classes, the student:

1. can use the knowledge in solving of the simple practise problems [K1_U01].

2. can choose the most important informations about the problem and look for missing data [K1_U02].

3. draws important conclusions from solutions to individual endurance problems and thus increases his qualifications [K1_U03].

Social competences

As a result of the conducated classes, the student:

1. can work independently and in a team on a given task, shows responsibility in this work [K1_K01].

2. shows diligence and meticulousness in the actions performed [K1_K02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Effect	Evaluation form	Assessment criteria
W01, W03, W07	Written exam (lecture)	50.1%-70.0% (3)
		70.1%-90.0% (4)
		>90.1% (5)
U01, U02, U03	Colloquia (exercise)	50.1%-70.0% (3)
		70.1%-90.0% (4)
		>90.1% (5)

K01, K02	Assessment of activity in the classroom, team cooperation,	50.1%-70.0% (3)
	creativity in solving problems	70.1%-90.0% (4)
		>90.1% (5)

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 – determinig of principial directiones and stresses by te using of anlytical (Mohr's circle) and graphic methods.

3. Relations between the vector field of displacements and the tensor field of strains

4. Flat state of strain

5. Pure shear state, generalized Hooke's law

6. Moments of inertia of plane figures

7. Elementary theory of torsion - cross-sectional torsional strength index

8. Torsion of thinwalled, cosed profiles - Bredt's patterns.

9. Bending theory

10. Strength hypothesis - the assesment of the strength of material under complex load state.

Teaching methods

1. Lecture: multimedial presentation, solving example tasks on the blackboard,

2. Exercises: solving tasks, discussion.

Bibliography

Basic

1. Wytrzymałość materiałów, J. Zielnica

2. Wytrzymałość materiałów T., M. Niezgodzińscy

3. Zbiór zadań z wytrzymałości materiałów F. Twardosz

Additional

1. Wytrzymałość materiałów Bielajew

Breakdown of average student's workload

	Hours	ECTS
Total workload	104	4,0
Classes requiring direct contact with the teacher	64	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate