COURSE DESCRIPTION CARD - SYLLABUS

Course name
Strength of materials [S1ETI2>WM]

Course

Field of study
Education in Technology and Informatics

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
15

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

6,00

Coordinators

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Lecturers

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

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.
3. has knowledge in range of solving simple strength problems by the using of the analytical method.

Skills:
As a result of the conducated classes, the student:
1. can use the knowledge in solving of the simple practise problems.
2. can choose the most important informations about the problem and look for missing data.
3. draws important conclusions from solutions to individual endurance problems and thus increases his qualifications.

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.
2. shows diligence and meticulousness in the actions performed.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Effect Evaluation form Assessment criteria
50.1%-70.0% (3)
Written exam (lecture) 70.1%-90.0% (4)
>90.1% (5)
50.1%-70.0% (3)
Colloquia (exercise) 70.1%-90.0% (4)
>90.1% (5)
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

They include: introduction of mathematical tools for describing material strength (stress and strain tensors), analytical dependencies of the plane stress state and generalized Hooke's law, analytical description of the strength of basic structural elements on the example of shafts and beams, complex loading state of material and dynamic loads .

Course topics

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	150	6,00
Classes requiring direct contact with the teacher	77	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	73	3,00