COURSE DESCRIPTION CARD - SYLLABUS

Course name

Course

Field of study
Materials Engineering

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-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
15

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
dr Andrzej Drzewiecki

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Wydziału Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of mechanics, analysis, analysis, analysis, vector calculus. The ability to think logically, to use information obtained from the Internet. Student understanding the origin of knowledge.

Course objective

Learning the basic knowledge of the theory of elasticity and plasticity.

Course-related learning outcomes

Knowledge

1. The student should learn the basics of the theory of elasticity - [K_W05].

2. The student should know what phenomena in nature and technology relate to the theory of elasticity - [K_W05].

Skills

1. The student is able to interpret natural and technical phenomena based on the knowledge of the theory of elasticity - [K_U11].

2. Student is able to perform a simple calculation related to elastic stresses - [K_U11]

Social competences

1. The student is able to work in a group. - [K_K03]

2. The student is aware of the need for lifelong learning - [K_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Credit on the basis of a written work (colloquium).

Exercises:

Credit based on written assignments and assessed activity during classes.

Programme content

Lecture:

1. Indicator record.

Elements of algebra and analysis of Cartesian tensors.

2. Deformation tensor; geometric interpretation of components.

3. Own problem.

4.Tensor of stress. Principal stresses and principal directions.

Extreme normal and tangential stresses.

5.Small strain tensor. Displacement and stress equations of theory

elasticity.

6. Plane state of stress and deformation.

Exercises:

1. To improve accounting skills related to the application of the Convention

sum and index notation.

2. Material and spatial description. Relations between the gradient of deformation and gradient displacement, deformation tensor and deformation tensor in both descriptions. Accounting examples.

3. Geometric and physical interpretation of the problems leading to the formulation eigenvalues for strain and stress tensors. Solving example issues.

4. Stress vector and stress tensor. Cauchy's law. Accounting examples.

5.Planar stress state, flat stress state. Airy function.

6. Torsion Saint-Venant.

Teaching methods

1. Lecture: presentation illustrated with examples given on the board, solving problems.

2. Exercises: problem solving, discussion.

Bibliography

Basic

1. S. Timoshenko, J. N. Goodier: Teoria sprężystości. Arkady Warszawa 1962

2. G. E. Mase: Theory and problems of continuum mechanics. McGraw Hil 1970

Additional

1. W. Nowacki: Teoria sprężystości. PWN, Warszawa 1970

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]		

[1] delete or add other activities as appropriate