COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mechanics and strength of materials

Course

Field of study

Automation and robotics

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

part-time

Requirements

compulsory

Number of hours

Lecture

18

Laboratory classes

0

Other (e.g. online)

0

Tutorials

18

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Knowledge: Basic knowledge of physics and mathematics (core curriculum for secondary schools, level basic)

Skills: The student starting this subject should have basic knowledge of mathematical analysis, calculus matrix and physics. Should have the ability to solve basic problems with math and skill obtaining iformation from the indicated sources.

Social Competences: He should also understand the necessity to expand his competences.

Course objective

1. Provide students with basic knowledge of statics, kinematics, dynamics and endurance materials.

2. Presentation of construction methods of mathematical models describing real objects.

3. Developing students' skills in solving simple problems in statics, kinematics and dynamics.

Course-related learning outcomes

Knowledge

1. has the knowledge necessary to understand the basic physical phenomena occurring in systems mechanical; - [K1_W2]

2.has ordered and theoretically founded general knowledge of general mechanics: statics, kinematics and dynamics, including the knowledge necessary to understand the principles of modeling and construction simple mechanical systems; - [K1_W3]

Skills

1. is able to design simple mechanical elements for various applications (taking into account material properties); - [K1_U25]

Social competences

1. understands the need and knows the possibilities of continuous training? raising competences professional, personal and social; - [K1_K1]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

a) in the field of lectures:

- on the basis of answers to questions about the material discussed in previous lectures and activity during the current lecture,

b) in the field of auditorium exercises:

- based on the assessment of the current progress in the implementation of tasks,

Summative assessment:

a) in the field of lectures, verification of the assumed learning outcomes is carried out by:

- assessment of knowledge and skills demonstrated in the written exam, assessment of knowledge and skills shown in the exam written, consisting of 5 questions and issues for which 10 points can be obtained (2 points for each each question or issue when scaling 0.5 points a), the grading scale is as follows: [5-6) 3.0, [6-7) 3.5, [7-8) 4.0, [8 - 9) 4.5, [9 - 10] 5.0;

- possibly additionally (during the oral exam) by assessing knowledge and skills on the basis of discuss the results of the written exam (and other questions and control issues) -

assessment can be increased or reduced (the teacher will notify about the necessity to take the oral exam after conducting a written exam);

b) in the field of auditorium exercises:

- assessment of knowledge and skills related to the implementation of exercise tasks through 1 colloquium in semester.

Programme content

The lecture covers the following issues:

- statics: principles of statics, basic body models in technical mechanics, equilibrium of systems flat and spatial - conditions of balance,

- kinematics: movement of a material point, movement of a system of material points, movement of the body stiff, flat body movement stiff, spherical motion of a rigid body, general motion of a rigid body, relative (complex) motion,

- dynamics: mass geometry, Newton's laws, the relativity principle of classical mechanics, dynamics material point dynamics of the system of material points dynamics of a rigid body (including: d'Alembert's principle, Euler's equations, kinetic and potential energy);

-basics of analytical mechanics: principles of mechanics, free system, constraints and their classification, generalized coordinates and generalized speeds, shifts prepared and possible, principle d'Alembert, the principle of prepared works, strengthgeneralized, equilibrium equations, types of equilibrium, Dirichlet's principle, general equation of dynamics analytical, Lagrange equations of the second kind, Hamilton's principle, Hamilton's equations, energy mechanical - kinetic and potential, the principle of conservation of energy,

- in the field of material strength: introduction, simple strength cases, stresses acceptable; hypotheses endurance; composite and fatigue strength.

-examples of some elementary problems from particular departments covered by the lecture.

As part of the exercises, students learn about:

- examples of solving statics equations: plane and spatial force system,

- examples concerning the kinematics of a material point and the system of material points,

- examples of composing equations of dynamics of a material point, arrangement of material points and solids stiff,

- examples illustrating the application of the analytical mechanics apparatus (the use of the principle of work prepared, composing equations of motion).

Teaching methods

1. Lecture: traditional presentation.

2. Tutorial exercises: solving tasks, case studies.

Bibliography

Basic

1. Mechanika ogólna, tom 1, Leyko J., Wydawnictwa Naukowe PWN, Warszawa, 2010

2. Mechanika ogólna, tom 2, Leyko J, Wydawnictwa Naukowe PWN, Warszawa, 2010

3. Mechanika techniczna, tom 1, Misiak J., Wydawnictwa Naukowo-Techniczne WNT, Warszawa, 2006

4. Mechanika techniczna, tom 2, Misiak J., Wydawnictwa Naukowo-Techniczne WNT, Warszawa, 1998

5. Mechanika ogólna, Niezgodziński T, Wydawnictwa Naukowe PWN, Warszawa, 2010

6. Zbiór zadań z mechaniki ogólnej, Niezgodziński M.E., Niezgodziński T., Wydawnictwa Naukowe PWN, Warszawa, 2009

7. Metodyka rozwiązywania zadań z mechaniki, Nizioł J., Wydawnictwa Naukowo-Techniczne WNT, Warszawa, 2002

8. Wytrzymałość materiałów, Niezgodziński M.E., Niezgodziński T., Wydawnictwa Naukowe PWN, Warszawa, 1998

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests/exam) [1]	60	3,0

[1] delete or add other activities as appropriate