COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technical mechanics

Course

Field of study

Energetics

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

20

Laboratory classes

Other (e.g. online)

Tutorials

20

Projects/seminars

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

dr inż. Bartosz Wieczorek

Responsible for the course/lecturer:

dr inż. Mateusz Kukla

Prerequisites

The student starting this subject should have a basic resource of mathematics knowledge including vector calculus, physics, materials science. He should also be able to obtain information from specified sources and be willing to cooperate as part of a team

Course objective

Providing students with knowledge of technical mechanics, to the extent specified by the curriculum content appropriate to the field of study. Developing students' skills: analytical thinking, associating and conscious use of computational methods, modeling physical phenomena using in technology, independent drawing conclusions and assessment of the analyzed issue. Developing students' teamwork skills

Course-related learning outcomes

Knowledge

Has advanced knowledge of physics, including mechanics, thermodynamics, fluid mechanics, electricity and magnetism, optics, nuclear physics and solid state physics, including the knowledge necessary to understand the basic physical phenomena occurring in and around electrical, energy and electronic components and systems. Knows and understands the need to use standardized symbols in engineering graphics. Has ordered knowledge of materials that meet the construction and operational requirements of machines and devices, modeling of mechanical systems; strength analysis of basic mechanical constructions; has the knowledge needed to understand the principles of operation of basic machine parts, the selection of typical machine parts; knows and understands the essence of technically and technologically proper construction of machines and devices, as well as knows the economic aspects of their construction.

Skills

Is able to develop documentation regarding the implementation of an engineering task using appropriate methods and tools, including advanced information and communication techniques (ICT); is able to prepare a text discussing the results of this task. Is able to prepare and present a short presentation of the results of the engineering task by using specialized terminology, take part in the debate, present and evaluate various opinions and positions and discuss about them.

Social competences

Rozumie potrzebę i zna możliwości ciągłego dokształcania się, podnoszenia kompetencji zawodowych, osobistych i społecznych (np. przez studia drugiego i trzeciego stopnia, studia podyplomowe, kursy); a także jest gotów do krytycznej oceny posiadanej wiedzy, uznaje jej znaczenie w rozwiązywaniu problemów poznawczych i praktycznych. Ma świadomość odpowiedzialności za pracę własną oraz gotowość podporządkowania się zasadom pracy w zespole i ponoszenia odpowiedzialności pełnionej roli zawodowej we wspólnie realizowanych zadaniach.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Written exam - tasks and questions from program content, written tests during classes

Programme content

Basic concepts, principles and axioms of mechanics. Statics: force, moment of force and pair of forces, flat systems of convergent and arbitrary forces, spatial systems, remarks on trusses, centers of gravity and moments of inertia of flat figures. Sliding and rolling friction. Strength of materials: concepts and principles of strength of materials, state of stress, deformation, Hooke's law, conditions of strength and stiffness for simple load cases, complex state of stress, material strain and strength hypotheses. Kinematics: point and rigid body kinematics, flat, rotary and spherical motion of a solid, relative (complex) motion, Coriolis acceleration. Dynamics: point and rigid body dynamics, d'Alembert principle, equations of material point and rigid body motion, work and power, mechanical efficiency, laws of behavior.

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board.
Exercises: task examples performed on a multimedia board, students solving tasks independently

Bibliography

Basic

1. J. Kubik, J. Mielniczuk: Mechanika techniczna dla inżynierów, Wyd. UKW, Bydgoszcz, 2017
2. J. Kubik, J. Mielniczuk, A. Wilczyński: Mechanika techniczna, PWN, Warszawa 1983
3. R. Bąk, A. Stawinoga: Mechanika dla niemechaników, WNT, Warszawa 2009

Additional

1. J. Rżysko: Statyka i wytrzymałość materiałów, PWN, Warszawa 1971
2. J. F. Sztyber: Elementy mechaniki technicznej, Wyd. SGGW, Warszawa 2004
3. Mały poradnik mechanika, praca zbiorowa, WNT

Breakdown of average student's workload

	Hours	ECTS
Total workload	144	5,0
Classes requiring direct contact with the teacher	67	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests/exam) [1]	77	3,0

1 delete or add other activities as appropriate