COURSE DESCRIPTION CARD - SYLLABUS

Course name
Technical mechanics [N1Trans1>MT]

Course

Field of study
Transport

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
9

Laboratory classes
0

Other (e.g. online)
0

Tutorials
9

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Knowledge: Basic in mathematics, including: vector calculus, elements of differential and integral calculus and the basics of physics in the field of mechanics Skills: The ability to model basic mechanical phenomena, represent and read geometry, the ability to constructive, analytical thinking. Social competences: Understanding the need to learn, expand knowledge, the role of the designer and his responsibility for his works

Course objective

Expanding students" knowledge in the field of mechanics (i.e. statics, kinematics and dynamics), and in particular providing them with the tools necessary for the theoretical analysis of mechanical devices, which is necessary in the later stages of teaching subjects related to the design of machines and devices.

Course-related learning outcomes

Knowledge:
The student has an extended and deepened knowledge of mathematics useful for formulating and solving complex technical tasks concerning various means of transport
The student has extended and in-depth knowledge of physics useful for formulating and solving selected

technical tasks, in particular for correct modeling of real problems
The student has a basic knowledge of the life cycle of means of transport, both equipment and software, and in particular about the key processes occuring in the product life cycle

Skills:
Student is able, when formulating and solving tasks in the field of transport, to apply appropriately selected methods, including analytical, simulation or experimental methods
Student is able to make a critical analysis of the functioning of transport systems and other technical solutions and to evaluate these solutions, including: is able to effectively participate in the technical inspection and assess the transport task from the point of view of non-functional requirements, has the ability to systematically conduct functional tests

Social competences:
The student correctly identifies and solves dilemmas related to the profession of a transport engineer

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Passing the lecture on the basis of a written and oral exam.
Completion of exercises on the basis of a test.

Programme content

Fundamentals of vector calculus, axioms of statics, types of constraints, internal and external forces. Equilibrium conditions of a planar and spatial convergent force system and the equilibrium conditions of any planar and spatial force system, statically determinate systems.
Reduction of the system of forces, a pair of forces. Discussion of issues related to friction.
Kinematics of a point, equations of point motion, motion of a point on a path, velocities and accelerations in Cartesian and in the natural coordinate system.
Rigid body motion: velocity and acceleration of any point in the body, rotary motion and plane motion.
Dynamics: two basic tasks of dynamics: simple and inverse, basic principles of behavior in mechanics, d"Alembert"s principle.
The principle of momentum and drive, the principle of conservation of momentum, the Center of Mass theorem, The principle of the twist and turn.

Course topics

none

Teaching methods

Traditional lecture or webinar with the use of multimedia presentations
Exercises at the blackboard

Bibliography

Basic
1. Sałata W., Mechanika ogólna w zarysie, Poznań, Wyd. PP 1998.
2. Leyko J., Mechanika ogólna. T. 1-2, Warszawa, PWN 2012
3. Misiak J. Zadania z mechaniki ogólnej. Część I, II, III Warszawa, WNT 2012
4. Nizioł J. Metodyka rozwiązywania zadań z mechaniki. Warszawa, WNT 2002
5. Niezgodziński T., Mechanika ogólna, Warszawa, PWN, 2011
Additional
1. Osiński Z. Mechanika ogólna. Warszawa, PWN 2000
2. Taylor J., Mechanika klasyczna T1-2 Warszawa PWN 2013

Breakdown of average student's workload

	Hours	ECTS
Total workload	48	2,00
Classes requiring direct contact with the teacher	18	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00