



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technical mechanics [S1Lot1>MT]

Course

Field of study

Aviation

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

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

30

Projects/seminars

0

Number of credit points

3,00

Coordinators

dr hab. inż. Roman Starosta

roman.starosta@put.poznan.pl

Lecturers

Prerequisites

A student starting this subject should have basic knowledge of physics and mathematics, including the basics of classical mechanics and the basics of differential and integral calculus. He should also have the ability to think logically, obtain information from indicated sources and be ready to cooperate within a team.

Course objective

Providing students with basic knowledge of mechanics, in the field of statics, kinematics and dynamics, which will enable them to study further subjects, including: in the field of strength of materials, basics of machine construction, vibrations, theory of machines and mechanisms, etc.

Course-related learning outcomes

none

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The final exam consists of a theoretical and task part. Theoretical issues on the basis of which questions

are developed will be sent to students by e-mail using the university e-mail system.
Completion of tutorials based on tests and activity during classes.

Programme content

Elements of vector calculus.
Statics, the study of the balance of various systems of forces
Reduction theorem
Balance of trusses, beams, frames
Static friction
Point kinematics
Kinematics of a rigid body

Course topics

Lecture:

- Elements of vector calculus: vector addition, scalar and vector products, vector moment about a point, vector moment about an axis; postulates of statics, resultant of a convergent system, three-force theorem, equilibrium equations of plane and spatial systems of forces
- Force pair, reduction theorem, resultant, main vector, main moment, wrench, theorem about main moment; resultant of a system of parallel forces, equilibrium of any plane system of forces
- Continuous load, bound solids, spatial systems
- Trusses, determining forces in members using the method of balancing nodes and the Ritter method; static and kinetic friction, cable friction, rolling resistance,
- Elements of mass geometry, static moment, center of gravity and center of mass; point kinematics, description of motion in the Cartesian system and in the natural system, speed, acceleration, tangential and normal acceleration,
- Solid kinematics; classification of motions, number of degrees of freedom, kinematic equations of motion, velocity projection theorem, translational, rotational, plane, spherical and general motion.
- elements of the dynamics of a material point, equation of motion, momentum, moment of momentum.

Teaching methods

Lecture: multimedia presentation, illustrated with examples given on the board
Tutorials: solving tasks on the board

Bibliography

Basic

1. J. Leyko, Mechanika ogólna, tom I i II, PWN, Warszawa, 2008
2. J. Misiak, Mechanika techniczna, tom I i II, WNT, Warszawa, 1996
3. M. Łunc, A. Szaniawski, Zarys mechaniki ogólnej, PWN, Warszawa, 1959
4. J. Misiak, Zadania z mechaniki ogólnej, Część I, II i III, Warszawa, WNT 2009
5. J. Nizioł, Metodyka rozwiązywania zadań z mechaniki, Warszawa, WNT 2007

Complementary

1. A. Bedford, W. Fowler, Engineering mechanics, Prentice Hall, New Jersey, 2002
2. D.J. McGill, Engineering Mechanics, PWS Publishers, Boston, 1985
3. J. Awrejcewicz, Mechanika techniczna, Warszawa WNT 2009
4. M.T. Niezgodziński, Zbiór zadań z mechaniki ogólnej, Wydawnictwo Naukowe PWN, Warszawa, 2009

Breakdown of average student's workload

	Hours	ECTS
Total workload	0	0,00
Classes requiring direct contact with the teacher	0	0,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	0	0,00