COURSE DESCRIPTION CARD - SYLLABUS

Course name
Technical mechanics [S1MiBM2>MT1]

Course

Field of study
Mechanical Engineering

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
45

Laboratory classes
0

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

The student has basic knowledge of mathematics, including vector, differential and integral calculus. Can think logically, learn with understanding, and use textbooks. Is aware of the need to expand their competences and understands the need to learn and acquire new knowledge.

Course objective

Providing students with basic knowledge of mechanics, in the field of statics, kinematics and dynamics, which will enable him to study further subjects. Developing students' skills: analytical thinking, associating and conscious use of computational methods, modeling of physical phenomena occurring in technology.

Course-related learning outcomes

Knowledge:
-

Skills:
-

Social competences:
-

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written egzam verifying proper understanding of the concepts of technical mechanics. Issues of theory will be delivered to the students
Exercises: tests and assessment activities in the classroom

Programme content

none

Course topics

- Introduction to the subject of mechanics, elements of vector calculus
- Postulates of statics, convergent plane and spatial systems, resultant, equilibrium equations, constraints
- Couple of forces, theorem on reduction, main vector, main moment, wrench, theorem about the main moment, reduction invariants, equilibrium conditions, plane system of forces, resultant of a system of parallel forces
- continuous load and its resultant, balance of systems of connected solids, determining the reaction of beams and frames
- Flat trusses, determining forces in rods by balancing nodes and Ritter's method; balance of spatial systems
- Static and kinetic friction, cable friction, Euler's formula, rolling resistance
- Geometry of masses, static moment, geometric center, moment of inertia for flat areas, Steiner's theorem, rotation of the coordinate system, main central moments of inertia
- Kinematics, including: point kinematics, velocity, acceleration, point motion in Cartesian and polar coordinates, tangential and normal acceleration
- Solid kinematics, translational, rotational, flat, spherical, general motion
- Complex motion, the Coriolis effect and its importance in nature and technology
- Dynamics of a material point, including: principles of dynamics, d'Alembert's principle, momentum, moment of momentum, dynamic equations of motion, free, forced and damped vibrations, work, energy, power, force field
- Dynamics of systems of material points, theorem on the motion of the center of mass, geometry of masses; centers of gravity, mass moments of inertia, elements of rigid body dynamics

Teaching methods

Lectures: multimedia presentation, ilustrated by the examples on the blackboard
Tutorials: solving exemplar problems on blackboard

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

Additional:
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.Niezgodzińscy, 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