COURSE DESCRIPTION CARD - SYLLABUS

Course name
Technical mechanics [S1ZiIP2>MT]

Course

Field of study
Management and Production 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
30

Laboratory classes
0

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

It has knowledge of mathematics and physics at the secondary level. It can think logically and it can obtain information from source literature. It understands the need to learn and acquire new knowledge and new skills.

Course objective

Getting knowledge of mechanics, indispensable to solve typical tasks in the area of point mechanics and the rigid body mechanics. Getting a basic knowledge of engineering computations covering the area of technical mechanics. Getting skills to interpret results and formulate conclusions

Course-related learning outcomes

Knowledge:
Has knowledge of point mechanics and rigid body mechanics relating to the field studied, indispensable to solve typical simple tasks in the area of the field studied.
Has a synthetic knowledge of various branches of mechanics indispensable for the interpretation of technical issues.
Has a basic knowledge of engineering computations covering the area of technical mechanics.

Skills:
Can use knowledge of mathematics and mechanics to analytically describe simple mechanical issues and processes.
Can use knowledge of mathematics and mechanics to solve problems in technical mechanics.
Can interpret the results of the analysis made and draw conclusions that follow from it.

Social competences:
Student understands the need for lifelong learning, can inspire and organize the learning process for other people. Student is aware of the role of mechanics in training of future engineers

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The grade is awarded based on passing the lectures in a written form. The pass consists of two equally weighted parts:
• theory (test),
• exercises (2 calculation tasks).
Points are converted into the final grade. To pass, it is required to obtain at least 50% of the points.
It is possible to be exempted from passing the lectures if the following conditions are met:
• passing the exercises in the first term with a grade of at least 4.0,
• attendance at lectures at a level of at least 80%.
After fulfilling the above conditions, one may be exempted from passing the lectures and receive a grade 0.5 lower than the grade from the exercises, e.g., exercise grade 4.0 - lecture grade 3.5..

Tutorials: assessment issued on the basis of current knowledge control in the form of tests and/or answers.
Credit for a positive grade after obtaining at least 50% of the total points.
Assignment of grades to percentage ranges of results: <90-100> very good; <80-90) good plus; <70-80) good; <60-70) satisfactory plus; <50-60) satisfactory; <0-50) unsatisfactory.

Programme content

Material particle and rigid body. Reference frame. Vector calculus in mechanics.
Statics.
Kinematics of point: the movement of point. Kinematics of rigid body.
Dynamics of material point. Dynamics of rigid bod

Course topics

Statics:- Principles of statics, bonds and the reactions, theorem on three forces, equilibrium of convergent system of forces, equilibrium of set of forces with lines of action lying in one plane, lattices, equilibrium of three-dimensional system of forces, friction, center of gravity
Kinematics of point: the movement of point (velocity and acceleration) of absolute and natural coordinate system. Kinematics of rigid body.
Dynamics of material point: Newton’s rules, dynamic equations of movement of a material point
Laws of movement of a point and set of material points: Momentum and angular momentum. Work, power and energy. Potential field of forces and principle of mechanical energy conservation
Dynamics of rigid body: The geometry of mass (static moment, the center of mass and moment of inertia of body). Momentum and angular momentum of rigid body. Dynamic equations of movement of a rigid body.

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board.
Classes: solving tasks on the board - practical exercises and discussion

Bibliography

Basic:
J. Leyko, Mechanika ogólna, t. 1 i 2, PWN, Warszawa, 2000
J. Misiak, Mechanika ogólna, tom I i II, PWN, Warszawa, 1969

J. Misiak, Zadania z mechaniki ogólnej, t. 1 2 3, WNT, Warszawa, 1992
W. Biały, Metodyczny zbiór zadań z mechaniki, WNT, Warszawa, 2004
J. Nizioł, Metodyka rozwiązywania zadań z mechaniki, WNT, Warszawa 2002

Additional:
Z. Osiński, Mechanika ogólna, PWN Warszawa 1994
T. J. Hoffmann, Podstawy mechaniki technicznej, Wydawnictwo Politechniki Poznańskiej, Poznań 2000
M. E. Niezgodziński, T. Niezgodziński, Zbiór zadań z mechaniki ogólnej, PWN, Warszawa 2008
I.W. Mieszczerski, Zbiór zadań z mechaniki, PWN, Warszawa 1969

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50