



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technical Mechanics

### Course

Field of study

Management and production engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Tutorials

30

Laboratory classes

Projects/seminars

Other (e.g. online)

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

dr Agnieszka Fraska

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Institute of Applied Mechanics

Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

### 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: Knowledge acquired during the lectures is verified at the final written exam. The pass threshold is 50 % of the points obtained on the basis of answers to questions about the material, that was discussed during lectures.

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.

## Programme content

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	4,0
Classes requiring direct contact with the teacher	75	2,5
Student's own work (literature studies, preparation for tutorials, preparation for tests and final exam) <sup>1</sup>	25	1,5

<sup>1</sup> delete or add other activities as appropriate