



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technical mechanics

### Course

Field of study

Power Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

Prof. dr hab. inż. Janusz Mielniczuk

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tel. 61 665 2335

Wydział Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

dr inż. Maciej Berdychowski

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tel. 61 224 4512

Wydział Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

### Prerequisites

Knowledge from the lectures in mathematics, physics, technical mechanics.

Applying the learned laws and principles of mechanics in solving simple problems of statics, kinematics, dynamics and durability

### Course objective

Learning about selected problems of technical mechanics in order to use them in the processes of independent solving of complex tasks and mechanical design.

### Course-related learning outcomes

Knowledge



Has extended knowledge of modeling of mechanical systems; strength analysis of basic mechanical constructions.

#### Skills

Is able to assess the suitability and selection of the calculation method, use or implement appropriate software appropriate to solve a given problem, taking into account the new achievements of technology and technology.

#### Social competences

Is ready to critically assess and analyze issues and recognizes the importance of knowledge in solving cognitive and practical problems in the field of energy.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- lecture - written test

- laboratory exercises - credit on the basis of grades from reports and a written check of the level of preparation for each class

#### Programme content

Lecture: Selected elements of statics; cranes, geometry of masses. Kinematics of complex motion, kinematics and dynamics of simple mechanisms, dynamic equations of motion of a mechanical system, mechanical vibrations. Strength and deformation of structures with complex loads; deflections of beams, buckling of columns, calculation of thin-walled tanks, fatigue strength.

Laboratories: A complex state of stress. Static and dynamic measurements. Measurements of variable speeds over time on the example of a cross-spherical articulated coupling. Torque measurements. Determination of critical rotations of shafts. Determination of the natural frequency. Static tensile test.

#### Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board.

Laboratory exercises: performance of tasks given by the teacher - practical exercises.

#### Bibliography

##### Basic

J. Kubik, J. Mielniczuk: Mechanika techniczna dla inżynierów, Wyd. UKW, Bydgoszcz 2017

J. Misiak: Mechanika techniczna, tomy I i II, WNT, Warszawa 1997, 2006

M. Banasiak (red.): Ćwiczenia laboratoryjne z wytrzymałości materiałów, PWN, Warszawa 2000

##### Additional

J. Rzyśko: Statyka i wytrzymałość materiałów, PWN, Warszawa 1971



R. Bąk, A. Stawinoga: Mechanika dla niemechaników, WNT, Warszawa 2009

Mały poradnik mechanika, praca zbiorowa, WNT

### Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	45	2,0

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