



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of designing elements and assemblies of machines

### Course

Field of study

Construction and exploitation of means of transport

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

polish

Requirements

elective

### Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

30

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo Str. 3, 60-965 Poznań

Responsible for the course/lecturer:

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### Prerequisites

Knowledge: The student has knowledge of physics (mechanics in the field of: statics, kinematics and dynamics), mathematics, after being passed in the study program

Skills: The student has the ability to solve problems in the field of mechanics, strength of materials, selection of materials based on their knowledge and the ability to obtain information from the indicated sources

Social competences: The student understands the need to expand their competences, shows readiness to cooperate as part of a team



### Course objective

1. To teach students the basics of machine construction, within the scope defined by the curriculum content specific to the field of study.
2. To develop students' skills:
  - calculating and constructing machine elements and assemblies,
  - documenting and reading technical documentation based on the knowledge gained from the object machine engineering graphics,
  - practical use of knowledge gained from the following subjects: mechanics, material strength, mechanical engineering, material science.
3. to improve students' teamwork skills.

### Course-related learning outcomes

#### Knowledge

Has basic knowledge of manufacturing techniques used in the engineering industry, such as casting, forming, reducing and incremental machining, welding and other joining techniques, cutting, coating and surface treatments.

Has basic knowledge of the strength of materials, including the basics of the theory of elasticity and plasticity, stress hypotheses, calculation methods for beams, membranes, shafts, joints and other simple structural elements, as well as methods of testing the strength of materials and the state of deformation and stress in mechanical structures.

Has basic knowledge of the basics of machine design and the theory of machines and mechanisms, including mechanical vibrations.

Has basic knowledge of the standardized rules of recording structures and engineering graphics.

#### Skills

Can prepare a technical descriptive and drawing documentation of an engineering task.

Can plan and carry out the process of constructing uncomplicated machinery units or machines and formulate requirements for electronic components and automatic control systems for industry specialists in mechatronic systems.

Can perform basic functional and strength calculations of machine elements such as traction, gear, friction, bearings, rolling and sliding gears, clutches, brakes.

#### Social competences

Is ready to critically assess his knowledge and received content

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.



Is ready to fulfill social obligations and co-organize activities for the benefit of the social environment.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam from the lecture, project execution.

### Programme content

Basic principles of the design process, elements of the mechanism, characteristics of the types of loads, defining loads and formulating appropriate strength conditions. Connections and their calculation: soldered, welded, glued; riveted, shaped connections: key, bolt, threaded connections. Screw mechanisms: examples and application, design calculations. Flexible elements: springs, rubber flexible elements.

### Teaching methods

Lecture, project

### Bibliography

Basic

1. Praca zbiorowa pod red. Z. Osińskiego, Podstawy konstrukcji maszyn, PWN, W-wa, 1999
2. Praca zbiorowa pod red. M. Dietricha: Podstawy konstrukcji maszyn. Tom 3, WNT, Wa-wa, 1999.
3. J. Żółtowski, Podstawy Konstrukcji Maszyn, Oficyna Wydawnicza Politechniki Warszawskiej, 2002.
4. R. Knosala, A. Gwiazda, A. Baier, P. Gendarz, Podstawy Konstrukcji Maszyn, WNT, Warszawa 2000.
5. A. Dziurski, L. Kania, A. Kasprzycki, E. Mazanek, Przykłady obliczeń z Podstawy Konstrukcji Maszyn, Tom 1 i 2, WNT, Warszawa 2005.

Additional

1. Dietrich M., Podstawy konstrukcji maszyn, Wydawnictwo Naukowo Techniczne 1995.
2. Niezgodziński M. E., Niezgodziński T., Wzory, wykresy i tablice wytrzymałościowe, Wydawnictwo Naukowo Techniczne, 1996,
3. Sempruch J., Piątkowski T., Podstawy konstrukcji maszyn z CAD, Piła, Państwowa Wyższa Szkoła zawodowa w Pile, 2006,
4. Bahl G., Beitz W., Nauka konstruowania, WNT, Warszawa 1984



### Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for tests/exam, project preparation) <sup>1</sup>	40	2,0

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