



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of machine design

### Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

polish

Requirements

elective

### Number of hours

Lecture

18

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

18

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

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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 credited as part of 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 the acquired 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. Provide students with knowledge of the basics of machine design, within the scope defined by the program content appropriate for the field of study.

2. Developing students' skills:

- calculating and constructing elements and assemblies of machines,

- documentation and reading of technical documentation based on the acquired knowledge

machine engineering graphics,

- practical use of knowledge acquired in the following subjects: mechanics,

strength of materials, machine science, materials science.

3. Shaping students' teamwork skills

### Course-related learning outcomes

#### Knowledge

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

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

Has basic knowledge of the strength of materials, including the basics of the theory of elasticity and plasticity, strain 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.

#### Skills

Is able to plan and carry out the process of constructing uncomplicated machine assemblies or machines and formulate requirements for electronic components and automatic control systems for industry specialists in mechatronic systems.

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

#### Social competences

He 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 professional roles responsibly, including:

- compliance with the rules of professional ethics and requiring this from others,

- care for the achievements and traditions of the profession.



## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written lecture exam, project execution.

## Programme content

Basic principles of the construction 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 and shaped connections: key, bolt, threaded connections. Screw mechanisms: examples and application, design calculations. Flexible elements: springs, rubber flexible elements.

## Teaching methods

Information lecture, project method.

## 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	36	2,0
Student's own work (literature studies, preparation for exam, preparation for project classes) <sup>1</sup>	64	2,0

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