



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of machine design

### Course

Field of study

Education in Technology and Informatics

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

compulsory

### Number of hours

Lecture

26

Laboratory classes

Other (e.g. online)

Tutorials

15

Projects/seminars

15

### Number of credit points

5

### Lecturers

Responsible for the course/lecturer:

dr inż. Magdalena Mierzwiczak

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

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### Prerequisites

Student has a fundamental knowledge in the field of mathematics, physics, mechanical engineering, engineering graphics and technical drawing, strength of materials and the manufacture and machining of engineering materials. Is able to plan time to carry out engineering tasks, plan and arrange self-education process, to formulate and prepare technical documentation, to extract information from the literature, spatial imagination abilities. Understands the need of and opportunities for continuous self-improvement, is able to cooperate and work in a team.

### Course objective

Provide the knowledge of the basics of machine design, develop of skills in constructing machine



elements and assemblies, creating the technical documentation, practical use of knowledge in mechanics, strength of materials and engineering materials, create the ability to cooperate and work in a team.

### Course-related learning outcomes

#### Knowledge

Has basic knowledge of general engineering construction principles of fields of studies associated with field of study.

Knows basic models and numerical methods used to machine design proces.

Knows principles of safety rules related to that work and the reliability of machine.

Knows the basic machines, their parts, connections and assemblies composed of parts.

Has basic knowledge of machine engineering construction to the extent enabling the preparation of engineering documentation.

#### Skills

Is able to design selected parts of machines for basic loads.

Is able to solve technical problems according to the laws of mechanics with the use of a mathematical rules.

Is able to design selected connections of machine parts for simple loads.

Knows the principles of operation and operating conditions for basic parts of machine.

Is able to develop documentation concerning the implementation of an engineering task in the field of the basics of machine design.

#### Social competences

Understands the need of self-improvement to raise professional competences.

Is able to identify priorities correctly in order to carry out a task defined by him or her or others.

Is able to work responsibly on task assigned to him or her both on his or her own and as part of a team, assuming various roles.

Follows the rules of professional ethics.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: an exam consisting of about 23 equally grade test theoretical questions and 7 simple calculation tasks .

Tutorials: a test (or 2 tests) consisting of 4-5 calculation tasks.



Project: preparation of a project on a given topic in the field of machine design (prepare technical documentation).

Assessment rules: credit on the basis on a obtained points: satisfactory grade after collecting at least 50% of the points provided for each type of activities.

### Programme content

The importance of the basics of machine design in modern technology.

Standardization, tolerance and fits.

Classification, structure, functions, application and problems of constructing of mechanical joint: separable (screw, threaded, shaped joints), inseparable (welded, riveted joints), frictional (press-fit, clamp). Springs.

Basic phenomena in machines: static and fatigue strength, creep, friction, structure stability.

Design and construction of the shafts.

General characteristics, application and design principles of mechanical transmissions.

Design and construction of the clutch and brake.

### Teaching methods

Lecture: multimedia presentation illustrated by examples given on a blackboard.

Tutorials: examples given on a blackboard, self-solved tasks, discussion.

Project: analysis of individual components of the project, discussion.

### Bibliography

Basic

1. Dziurski A., Kania L., Kasprzycki A. Mazanek E.: Przykłady obliczeń z podstaw konstrukcji maszyn. Warszawa, WNT, 2017.
2. Magnucki K.: Podstawy konstrukcji maszyn. Wydawnictwo Politechniki Poznańskiej, 2008.
3. Mazanek E (Red.): Przykłady obliczeń z podstaw konstrukcji maszyn. Warszawa, WNT, 2005.
4. Skoć A., Spałek J.: Podstawy konstrukcji maszyn 1. Warszawa, WNT, 2006, 2012
5. Skoć A.: Przykłady obliczeń, zadania do rozwiązania z podstaw konstrukcji maszyn tom I i II, WPŚ Gliwice 2014, 2009

Additional

1. Dietrich M. (Red.): Podstawy konstrukcji maszyn. Warszawa, WNT, 1999.



2. Dobrzański T.: Rysunek techniczny maszynowy. Warszawa, WNT, 2002.
3. Konsola R., Gwiazda A., Baier A., Gendarz P.: Podstawy konstrukcji maszyn Przykłady obliczeń. Warszawa, WNT, 2017.
4. Kurmaz L.W., Kurmaz O.L.: Podstawy konstruowania węzłów i części maszyn. Podręcznik konstruowania, Kielce, WPS, 2011.
5. Osiński Z.: Podstawy konstrukcji maszyn. Warszawa, Wyd. Naukowe PWN, 2002.
6. Rutkowski A.: Części maszyn. Warszawa, WSiP, 2003.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	135	5,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	75	3,0

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