



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Construction and exploitation of machines

### Course

Field of study

Logistics

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

15

Tutorials

0

Laboratory classes

15

Projects/seminars

0

Other (e.g. online)

0

### Number of credit points

2

### 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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Faculty of Mechanical Engineering

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### Prerequisites



Knowledge of physics (mechanics in the field of: statics, kinematics and dynamics), mathematics, after passing as part of the study program.

Ability to solve problems with the basics of machine design based on knowledge and the ability to obtain information from specified sources.

Awareness of the need to expand their competences, readiness to cooperate within a team.

### Course objective

Understanding the structure and elements of the mechatronic system. Acquiring the skills of an interdisciplinary approach to issues related to machine design.

### Course-related learning outcomes

#### Knowledge

Knows the basic methods, techniques, tools and materials used to solve simple engineering tasks in the field of machine construction and operation as well as typical industrial technologies, knows the technology of machine construction and exploitation [P6S\_WG\_01].

Has basic knowledge of the life cycle of machines and industrial products [P6S\_WG\_02].

#### Skills

Can make a critical analysis of the technological processes of machine production and organization of production systems [P6S\_UW\_03].

Is able to apply typical methods of solving simple problems in the field of machine construction and exploitation, design the construction and technology of simple machine parts and subassemblies, and design the organization of production units of the first degree of complexity [P6S\_UO\_02].

Is able to identify design tasks and solve simple design tasks in the field of machine construction and exploitation [P6S\_UU\_01].

#### Social competences

Is aware of initiating activities related to the formulation and transfer of information and cooperation in society in the field of machine design and exploitation [P6S\_KO\_02].

Is aware of cooperation and work in a group on solving technical problems within the field of machine design and exploitation [P6S\_KR\_02].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written lecture exam. Performance of final essay as part of the laboratory classes.

### Programme content

Lecture:



Machine construction process, computer aided design. The essence of the mechatronic system, the basic elements of the system. Construction of actuators, sensors, their functions and selection principles. Structure of the design and construction process of the mechatronic device. Stages of mechatronic design. Design assumptions, system modeling, principles of designing mechanical, electronic and control systems, selection and construction of components. Examples of mechatronic constructions. Selection of components from catalogs. Application of computer simulation in design. Preparation of mechatronic equipment documentation.

Laboratories:

Designing of mechanical systems, selection and construction of components. Selection of components from catalogs. Application of computer simulation in design. Preparation of mechatronic equipment documentation.

### Teaching methods

Informative lecture with multimedia presentation, using the case method (case study) - analysis of the solution of real construction problems. Workshop methods of practical construction classes in laboratories.

### Bibliography

Basic

1. Praca zbiorowa pod red. Z. Osińskiego, Podstawy konstrukcji maszyn, PWN, W-wa, 1999.
2. Heimann B., Gerth W., Popp K.: Mechatronika. Komponenty. Metody. Przykłady, PWN, Warszawa 2001.
3. Gawrysiak M.: Analiza systemowa urządzenia mechatronicznego, Wyd. Politechniki Białostockiej, Białystok 1997.
4. Skrzyszowski Z.: Podnośniki i prasy śrubowe PKM – projektowanie, Politechnika Krakowska, Kraków 2005.

Additional

1. Uhla T. Projektowanie mechatroniczne zagadnienia wybrane, Kraków 2007.
2. Kurmaz O.: Projektowanie węzłów i części maszyn, Kielce 2004.
3. Juchnikowski W., Żółtowski J.: Podstawy Konstrukcji Maszyn – pomoce do projektowania z atlasem, Politechnika Warszawska, Warszawa 2004.



### Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests/exam) <sup>1</sup>	30	1,0

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