



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mechatronic design

Course

Field of study

Year/Semester

Construction and operation of means of transport

3/6

Area of study (specialization)

Profile of study

Industrial mechatronics

general academic

Level of study

Course offered in

First-cycle studies

polish

Form of study

Requirements

full-time

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

0

Tutorials

Projects/seminars

0

15

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

MSc Eng. Dominik Wojtkowiak

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Faculty of Mechanical Engineering

ul. Piotrowo 3, 61-138 Poznań

Responsible for the course/lecturer:

DSc Eng. Krzysztof Talaśka

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phone: 61 665 2246

Faculty of Mechanical Engineering

ul. Piotrowo 3, 61-138 Poznań

Prerequisites

Knowledge: Knowledge of the basics of machines and drive systems, the basics of electrical engineering, the basics of computer science, elements of the mechatronic system.

Skills: Independent formulation of a technical problem, design record in accordance with the rules of technical drawing, strength calculations of machine elements, the ability to shape the design features of machine components.

Social competences: Understanding the necessity to expand one's competences, readiness to cooperate within the team



Course objective

Getting to know the structure and elements of the mechatronic system. Acquiring the skills of an interdisciplinary approach to issues related to the design of machines.

Course-related learning outcomes

Knowledge

1. Is aware of the latest trends in machine construction, i.e. automation and mechatronization, automation of machine design and construction processes, increased safety and comfort of operation, use of modern construction materials
2. Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge about the construction, methods of construction, production and operation of a selected group of working machines, in particular mechatronic systems

Skills

1. 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 systems.
2. Can create a system diagram, select elements and perform basic calculations using ready-made calculation packages for mechanical, hydrostatic, electric or hybrid machine drive system.
3. Can search catalogs and manufacturers' websites for ready-made machine components to be used in his own projects.
4. Can organize and substantially manage the process of designing and operating a simple machine from a group of machines from the group covered by a selected specialty.
5. Can use popular packages for editing technical drawings and 3D modeling to the extent that allows the creation of drawing documentation in accordance with applicable drawing standards and models of virtual machines in three-dimensional space.

Social competences

1. Is ready to critically assess the knowledge and content received
2. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties with solving the problem on its own

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam for the lecture. Implementation of the final project.

Programme content

The essence of the mechatronic system, the basic elements of the system. Structure of actors, sensors, their functions and principles of selection. Signal transmission and processing. Creating a system model. The structure of the design and construction process of a mechatronic device. Stages of mechatronic



design. Design assumptions, system modeling, principles of designing mechanical, electronic and control systems, selection and construction of components, identification. Examples of mechatronic structures. Control and regulation. Development of control algorithms. Selection of components from catalogs. Application of computer simulation in design. Preparation of documentation for mechatronic devices. CE certification.

Teaching methods

Informative lecture with a multimedia presentation, using the case study method - analysis of solutions to real construction problems. Workshop methods of practical construction classes. Project methods used in design classes.

Bibliography

Basic

1. Heimann B., Gerth W., Popp K.: Mechatronika. Komponenty. Metody. Przykłady, PWN, Warszawa 2001,
2. Gawrysiak M.: Analiza systemowa urządzenia mechatronicznego, Wyd. Politechniki Białostockiej, Białystok 1997.

Additional

1. Uhla T. Projektowanie mechatroniczne zagadnienia wybrane, Kraków 2007

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	45	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	15	1,0

¹ delete or add other activities as appropriate