



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Driving systems of working machines

### Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

Machines

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

4/6

Profile of study

general academic

Course offered in

Polish

Requirements

elective

### Number of hours

Lecture

18

Laboratory classes

9

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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### Prerequisites

Knowledge: The knowledge acquired in the course of hydraulic and pneumatic drives. Basic knowledge of the basics of machine construction, machine science.

Skills: Skills acquired within the subjects: Hydraulic and pneumatic drives, Fundamentals of machine construction. Basic ability to solve problems in the field of fluid mechanics, automatics and mechanics.

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

### Course objective

Getting to know the structure of drive systems of self-propelled working machines, types, construction



and characteristics of drives and methods of their control. Research and computer simulation of selected hydrostatic systems used in drives of working machines.

### Course-related learning outcomes

#### Knowledge

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 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.

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, the use of modern construction materials.

#### Skills

Can competently advise on the selection of a machine for a given application in the industry covered by the selected diploma path based on the acquired knowledge about a given group of machines.

Can draw a diagram and a simple machine element by hand in accordance with the rules of technical drawing.

Can organize and substantively manage the process of designing and operating a simple machine from a group of machines from the group covered by the selected diploma path.

#### 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 willing to think and act in an entrepreneurial manner.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written exam.

Laboratory - credit based on the reports and the implementation of practical assembly and design tasks.

### Programme content

Control and regulation of hydrostatic drives, control systems. Analysis of exemplary drive systems of wheeled and tracked machines. Hydraulic steering servos. Drive systems with DC and AC motors.



Control and regulation of rotational speed of electric motors, braking, change of direction of work  
Computer programs for modeling and simulating hydraulic and electrohydraulic drives.

### Teaching methods

Lecture with multimedia presentation

Laboratory - performing the tasks given by the teacher - practical exercises

### Bibliography

Basic

1. Osiecki A.: Hydrostatyczny napęd maszyn. WNT, Warszawa , 2004.
2. Stryczek St.: Napęd hydrostatyczny elementy. WNT, Warszawa, 2003.
3. Stryczek St.: Napęd hydrostatyczny układy . WNT, Warszawa, 2003.
4. Szenajch W.: Napęd i sterowanie pneumatyczne. WNT, Warszawa, 2003.
5. Urbanowicz H.: Napęd elektryczny maszyn roboczych WNT Warszawa 1979.
6. Grzbiela C., Machowski A.: Maszyny, urządzenia elektryczne i automatyka w przemyśle Katowice 2010.

Additional

1. Szydelski Z.: Pojazdy samochodowe napęd i sterowanie hydrauliczne. WKŁ, W-wa,1999.
2. Pr. zb. pod red. J. Świdra: Sterowanie i automatyzacja procesów technologicznych i układów mechatronicznych. Wyd. Politechniki Śląskiej, Gliwice, 2002.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	27	1,0
Student's own work (literature studies, preparation for tutorials, preparation for exam) <sup>1</sup>	48	2,0

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