



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Hydraulic and Pneumatic Drives

Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

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Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

0

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr inż. Damian Frackowiak

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Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

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tel. 61 224 4514

Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań

Prerequisites

KNOWLEDGE: Knowledge of the basics of machine design, fluid mechanics, automation and electrical engineering basics.

SKILLS: Ability to solve problems in the field of fluid mechanics and base of machines design.

SOCIAL COMPETENCIES: Understanding the need to expand their competence, willingness to work together as a team.

Course objective

Understanding the structure and principles of hydraulics and pneumatics. Familiarizing yourself with the



basic propulsion systems and controls. Getting to know the basics of design for hydraulic and pneumatic systems.

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 basic knowledge of the standardized rules of recording structures and engineering graphics.

Has basic knowledge of the technical mechanics of fluids, i.e. ideal liquids and gases, Newtonian and non-Newtonian viscous liquids, theory of thermal-flow machines.

Skills

Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.

Can perform elementary technical calculations in the field of fluid mechanics and thermodynamics, such as heat and mass balances, pressure losses in pipelines, select parameters of blowers and fans for ventilation and transport systems, and calculate thermodynamic courses in thermal machines.

Can create a system diagram, select elements and perform basic calculations using ready-made computational packages of mechanical, hydrostatic, electric or hybrid machine drive system.

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 ready to fulfill social obligations and co-organize activities for the benefit of the social environment.

Is ready to initiate actions for the public interest.

Is willing to think and act in an entrepreneurial manner.

Is ready to fulfill professional roles responsibly, including:

- observing the rules of professional ethics and requiring this from others, - caring 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 exam of the course. Assessment of laboratory exercises based on assessments of the reports and short entrance tests.



Programme content

Structure, principle of operation and properties of hydraulic and pneumatic drives. Application. Hydraulic fluids. Basics of calculations of hydraulic and pneumatic systems. Elements of hydraulic and pneumatic systems: pumps, compressors, power installations, valves, motors, actuators, auxiliary elements. Basic hydraulic and pneumatic systems. Hydrostatic transmissions. Circuits implemented in proportional and servo techniques. Application programs for computer aided analysis of hydraulic and pneumatic systems. As part of the laboratory: learning about the construction, principles of operation of hydraulic and pneumatic elements and systems, determining the characteristics of basic elements, testing selected drive systems.

Teaching methods

1. Lecture with multimedia presentation.
2. Laboratory classes.

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.

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	100	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	55	2,0

¹ delete or add other activities as appropriate