



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Hydraulics and pneumatics [N1MiBM2>HiP]

### Course

Field of study

Mechanical Engineering

Year/Semester

4/7

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

### Number of hours

Lecture

16

Laboratory classes

8

Other (e.g. online)

0

Tutorials

0

Projects/seminars

8

### Number of credit points

4,00

### Coordinators

### Lecturers

### Prerequisites

Basic in the field of machine science, machine parts, engineering graphics and other areas of education in the field of study. Ordered theoretical knowledge in the field of fluid mechanics, automation.

### Course objective

Getting to know the construction and principle of operation and methods of designing drives and hydraulic and pneumatic systems as well as subassemblies and elements used in them, gaining knowledge about pumps, compressors, valves and hydraulic and pneumatic motors and actuators.

### Course-related learning outcomes

Knowledge:

Having detailed knowledge of the principles of operation of hydraulic and pneumatic systems and drives, including the basics of fluid technology.

Skills:

Designing and supervising as well as operating hydraulic and pneumatic systems to ensure reliable and safe operation of machines and devices, as well as conducting diagnostics of hydraulic and pneumatic drives.

Social competences:

Collaborating and working in a group, taking on various different roles and tasks.

Awareness of the social role of a graduate of a technical university, and in particular understanding the need to formulate and provide the public with information and opinions on the achievements of technology and other aspects of engineering activity; formulating and transmitting information and opinions in a way that is universally understandable.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Evaluation for solving laboratory tasks,  
final test on exercises,  
Exam on the issues covered in the lecture part.

### Programme content

Lecture:

- characteristics of tidal drives,
  - media used in fluid drives,
  - elements used in hydraulic and pneumatic drives,
  - compressed air preparation systems and hydraulic power packs,
  - hydraulic and pneumatic systems in industry, design and implementation,
  - controlling the parameters of hydraulic and pneumatic drives,
  - practical applications of hydraulic and pneumatic systems and drives,
  - practical applications of pneumatic systems and drives,
- Operation and maintenance of pneumatic and hydraulic systems
- rules of safety in the operation of pneumatic and hydraulic drives.

Exercises:

- work cycles of hydraulic and pneumatic systems,
- selection of parts and subassemblies for the construction of systems,
- layout design,
- calculation of working parameters.

Laboratory classes:

- determination of characteristics of selected hydraulic elements,
- connection of basic hydraulic systems and their commissioning,
- connecting pneumatic and electropneumatic systems,
- simulation of the phenomenon of cavitation.

### Course topics

none

### Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the board, discussion and problem analysis.
2. Exercises: solving problems, designing and modeling systems, discussion, teamwork.
3. Laboratory classes: conducting experiments, practical exercises, implementation of circuits, discussion, teamwork.

### Bibliography

Basic:

1. Napęd hydrostatyczny, Tom 1, Stryczek S., Wydawnictwa Naukowo-Techniczne, Warszawa 2016
2. Napęd hydrostatyczny, Tom 2, Stryczek S., Wydawnictwa Naukowo-Techniczne, Warszawa 2015
3. Hydraulika siłowa, Zbiór zadań z rozwiązaniami Sobczyk P., PWN 2016
4. Hydraulika i pneumatyka Zbiór zadań z rozwiązaniami Sobczyk P., PWN 2021
5. Podstawy mechaniki płynów i hydrauliki, Puzyrewski R., Sawicki J. PWN 2023
6. Napęd i sterowanie pneumatyczne, Szenajch W., Wydawnictwa Naukowo-Techniczne, Warszawa 1997
7. Napędy i Sterowania hydrauliczne i pneumatyczne, Tomasiak E., Wydawnictwo Politechniki Śląskiej,

Additional:

1. Katalogi producentów elementów hydraulicznych i pneumatycznych
2. Strony internetowe producentów elementów hydraulicznych i pneumatycznych

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	34	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	66	2,50