



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Compressors, blowers and fans

### Course

Field of study

Industrial and Renewable Energy

Area of study (specialization)

Thermal Engineering and Renewable Energy

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

9

Laboratory classes

Other (e.g. online)

Tutorials

18

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr inż. Bartosz Ziegler

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tel. 616652344

Responsible for the course/lecturer:

### Prerequisites

Knowledge of basic physical principles (in particular, principles of behavior). Basic knowledge of vector calculus and partial differential calculus. Knowledge of the subject "Selected fluid mechanics issues" regarding the principles of operation of flow-through rotor machines. Knowledge of thermodynamics of gas transformations.

### Course objective

Learn the basics of design, selection and operation of both positive displacement and rotor compression machines.

### Course-related learning outcomes

Knowledge



1. EC2A\_W01 (P7S\_WG) Has extended knowledge of construction, design methods and performance characteristics of compressor machines
2. EC2A\_W04 (P7S\_WG) Knows the development trends, and has knowledge of the modern "state of the art." Compression Machines
3. EC2A\_W07 (P7S\_WG) Has ordered and in-depth knowledge of the impact of operational parameters on (working point) of compression machines on the efficiency and stability of the system

#### Skills

1. E2A\_U02 (P7S\_UW). Can use his knowledge and skills to read the characteristics and selection of fluid machines as well as the use of analytical tools (e.g. CAE software) in the design and analysis of compression machines.
2. E2A\_U03 (P7S\_UW). Can use his knowledge and skills to adapt existing or create new methods and tools for analyzing compression machines and in particular their cooperation with the installation with which they cooperate.
3. E2A\_U04 (P7S\_UW). Can use the acquired knowledge and experience in the diagnostics of installations cooperating with compressor machines, and in particular is able to determine the important measurement parameters, measurement technique and method of interpretation of results for solving research problems and engineering tasks

#### Social competences

1. E2A\_K02 (P7S\_KK) Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem yourself
2. E2A\_K03 (P7S\_KO) Is ready to fulfill social obligations, inspire and organize activities for the social environment, in particular reliable appearing as an expert in the field.
3. E2A\_K06 (P7S\_KR) Is ready to perform responsible professional roles with recognition of the ethics of the profession and a sense of responsibility for the decisions taken

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

1. Written exam
2. written exercises exam
3. Project task report

#### Programme content

- Analytical models of rotor and displacement compressors
- Displacement compressor work cycle
- Thermodynamics of transformations in compressors



- Calculation of unit work, efficiency, characteristic coefficients
- Compressor characteristics (their reading, creation)
- Selection of compression machines for installation

### Teaching methods

Converasatory lecture

excercises

Design procedure demonstration

### Bibliography

Basic

1. J. Walczak, Promieniowe Sprężarki Dmuchawy i Wentylatory, Wydawnictwo Politechniki Poznańskiej
2. A. Witkowski, Sprężarki wirnikowe. Teoria, konstrukcja, eksploatacja, Wydawnictwo Politechniki Śląskiej

Additional

### Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for tutorials, preparation for test, project preparation) <sup>1</sup>	60	2,0

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