STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Compressors, Blowers and Fans		**1010632221010630276**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**(brak)**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Thermal Engineering	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours				No. of credits
Lecture: **2**	Classes: **2**	Laboratory: **-**	Project/seminars: **-**	**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**4 100%**
Technical sciences	**4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The student has a basic knowledge about the fans, blowers and compressors in the system of science and the relationship with other areas of knowledge. The student knows and understands the complex methods and practical tools in the field of compression machines. The student knows the main tasks in the area of compression machines functioning and economic development of enterprises and the state.
2	**Skills**	The student is able to use the concepts and methods of design and operating machinery tendons. Student is able to use the acquired knowledge to analyze specific physical phenomena and thermodynamic processes occurring in the flow and compression machines. The student is able to solve specific problems in the design and operational issues compression machines.
3	**Social competencies**	The student is able to work in a group, taking in her various roles. Student is able to prioritize important in solving the tasks posed in front of him. The student demonstrates self-reliance in solving problems, acquire and improve their knowledge and skills.

Assumptions and objectives of the course:

The aim of the course is to provide students with knowledge of the compression machine definitions, concepts and issues thermodynamic and flow with respect to the compression process. Students gain knowledge and skills in the construction, design methods and ways of operating compressors blowers and fans.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. . The student has an extended knowledge of thermodynamics and gas dynamics to the extent necessary for an understanding of the principles and calculations of thermodynamic processes occurring in the flow and compression machines - compressors, blowers and fans - [K2A_W04]

2. He knows the modern methods of computer graphics engineering iteoretyczne basis of calculation finite element - [K2A_W06]

3. The student has a general understanding of the types of research and testing machines compression methods using modern measurement techniques and data acquisition - [K2A_W20]

Skills:

1. The student can obtain information from the literature, the Internet, databases and other sources, in Polish and foreign, can integrate the information obtained to interpret and draw conclusions from them, and create and justify opinions.. - [K2A_U01]

2. The student can use the assimilated knowledge of thermodynamics and gas dynamics simulation of thermodynamic processes and flow occurring in compression machines, using specialized computer software - [K2A_U04]

3. Student is able to perform basic measurements of mechanical and thermodynamic such as pressure increases, mass flow and volume, temperature rise, mechanical power, rotor speed on the test machine compression using modern measurement systems - [K2A_U07]

4. The student is able to plan and carry out experimental studies of flow phenomena occurring in the non-stationary machines, compression, and basic research such that the stationary machines - [K2A_U08]

Social competencies:

1. The student understands the need and knows the possibilities of continuous training, knows the need to acquire new knowledge for professional development. - [K2A_K01]

2. Student is able to determine the priorities for implementing the tasks undertaken. - [K2A_K04]

3. Student is able to think and act in an entrepreneurial manner, make decisions, work for the development of the employer and society - [K2A_K05]

4. The student is aware of the knowledge gained from compressing machines subject to the public, shall endeavor to ensure that information can be understood - [K2A_K06]

Assessment methods of study outcomes

The written examination, final test, project

Course description

Analysis of basic flow phenomena and thermodynamic changes occurring in compression machines. And numerical methods for one-dimensional compression machine design , interpretation of the physical indicators and indicators of work flow . Knowledge and physical interpretation of the definition of isentropic efficiency , politiropowej , volumetric , mechanical, electrical , general compression machines and methods of lifting . Qualitative and quantitative evaluation of flow phenomena occurring in compression machines based on analysis of one-dimensional and three-dimensional nature of the flow on the basis of numerical calculations of actual gas flow and anemometric research methods. The methods of selection and flow parameters of compression machines working in series and in parallel . Ways to protect equipment from damage tendons as a result of exceeding the operating parameters and the occurrence of phenomena pumping soft and hard . The choice of compression equipment for compressed air . Methods for determining losses and leakage wading rims spinning and stationary flow compression machines and systems reciprocating and screw positive displacement compression machines .

Basic bibliography:

1. Tuliszka E., Sprężarki, dmuchawy i wentylatory, WNT, Warszawa 1976

2. Sakun I. A., Sprężarki śrubowe, WNT, Warszawa 1960

3. Prandtl L., Dynamika gazów, PWN, Warszawa 1956

Additional bibliography:

1. Fodemski T.R. i inni, Pomiary cieplne cz.II, Badania cieplne maszyn i urządzeń, WNT, Warszawa 2000

2. Walczak J., Termodynamiczno-przepływowe podstawy mechaniki płynów, Wydawnictwo Politechniki Poznańskiej, Poznań 2005

3. Walczak J., Inżynierska mechanika płynów, Wydawnictwo Politechniki Poznańskiej, Poznań 2006

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	30
2. Consultation	4
3. Exam preparation	10
4. Participation in the exam	2
5. Preparation in class exercises	30
6. Consultation	4
7. Preparing to pass	5

Student's workload

Source of workload	hours	ECTS
Total workload	87	4
Contact hours	72	2
Practical activities	2	2