STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Heating and Cooling Equipments**		Code **1010612221010610500**
Field of study **Transport**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 2**
Elective path/specialty **Road Transport**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **2** Classes: **1** Laboratory: **-** Project/seminars: **-**		No. of credits **4**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **4 100%** **4 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student has a basic knowledge of heat and mass transfer, the student understand the processes occurring in the cargoes requiring temperature-controlled transport, the student knows the rules of carriage of goods under controlled temperatures.
2	**Skills**	Student is able to use the concepts and methods of thermodynamics and fluid mechanics. Students can use their knowledge to analyze specific phenomena and processes in the cargo in transport under controlled temperatures. Students are able to solve specific problems arising during cargo under controlled temperatures.
3	**Social competencies**	Students can work together in a group, taking the different roles. The student is able to prioritize important in solving the tasks posed in front of him, show independence 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 information relating to shape the kryptoklimat in the load area of transport. Students gain knowledge and skills to shape the functioning of kryptoklimat in the load area, they can choose the equipment and know the rules for their use.

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

Knowledge:

1. Student has a detailed knowledge of the means of transport for carriage under controlled temperatures, knows the importance of transport in controlled temperatures in the economic system of the country, region and city, knows the ways of organizing transport of goods at controlled temperatures - [K1A_W10]

2. Student has a structured, theoretically founded knowledge in the field of transport infrastructure under controlled temperatures, knows basic design parameters and operating modes of transport for the carriage of goods under controlled temperatures, can organize transport under controlled temperatures. - [K1A_W12]

Skills:

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1. Student can obtain information from the literature, the Internet, databases and other sources, in Polish and foreign, can integrate the information to interpret and learn from them, and create and justify opinions. - [K1A_U01]

2. Student can communicate using a variety of techniques in a professional environment and other environments using the formal record of the model transport systems, concepts and definitions of the scope of the degree program being studied - [K1A_U02]

3. Student can use the native language and international (English) to the extent that technical comprehension and writing descriptions of the use of dictionaries of technical objects in its field of technology (knowledge of technical terminology). - [K1A_U03]

4. Student can use the verbal one additional foreign language at the level of everyday language, we can describe in this language being studied issues related to the field of study, can prepare the technical documentation descriptive drawing transport task. - [K1A_U04]

5. Student has the ability to self-education using modern teaching tools such as remote lectures, web pages and databases, educational software, electronic books and magazines. - [K1A_U06]

Social competencies:

1. Student understands the need and knows the possibility of lifelong learning, knows the need to acquire new knowledge in order to develop professional. - [K1A_K01]

2. Student can think and act in an entrepreneurial manner, make decisions, work for the development of the employer and society. - [K1A _K07]

3. Student can think and act in an entrepreneurial manner, make decisions, work for the development of the employer and society. - [K1A _K08]

Assessment methods of study outcomes

Written exam. Final test

Course description

Requirements for means of transport for the carriage of goods under controlled temperatures; classification heating equipment, designs and performance requirements of heating equipment, principles of refrigeration equipment, refrigeration design solutions, methodology for diagnosing refrigeration equipment, technical and economic indicators characterizing the heating and cooling; consequential damages , the effect of heating and cooling on the environment; directions of heating and cooling.

Basic bibliography:

1. Starkowski P., Bieńczak K., Zwierzycki W.; Samochodowy transport krajowy i międzynarodowy; tom V, Systherm, 2012, Poznań.

2. Zwierzycki W., Bieńczak K. [red]; Pojazdy chłodnicze w transporcie żywności; Systherm, 2006, Poznań.

3. Kwaśnikowski S., Pojazdy izotermiczne i chłodnicze; Navigator, 1997, Wrocław.

Additional bibliography:

1. Bieńczak K. [red]; Podstawy diagnostyki układów termoizolacyjnych do transportu żywności, Wydawnictwo ITE, 2004, Poznań- Radom.

2. Bieńczak K., Modelowanie warunków chłodniczego przewozu żywności, wyd. PP, 2009, Poznań.

Result of average student's workload

Activity	Time (working hours)
1. Preparation for lectures	5
2. Participation in the lecture	30
3. Strengthening the lecture content	10
4. Consultation	6
5. Preparation for the exam	20
6. Participation in the exam	1
7. Preparing for class exercises	15
8. Participation in class exercises	15
9. Preparation of the exercises	15
10. Consultation	10
11. Preparation for the final test	10

Student's workload

Source of workload	hours	ECTS
Total workload	138	4

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Contact hours	63	2
Practical activities	30	1

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