COURSE DESCRIPTION CARD - SYLLABUS

Course name
Refrigeration, air conditioning and heating equipment in transport [S1Trans1>UChKiGwT]

Course

Field of study
Transport

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Knowledge: Has a general knowledge of the impact of technical facilities and technologies on the environment Skills: Is able to define categories of threats to the environment as a specific technological process implemented in the area of production and operation of food machinery and refrigeration equipment and indicate ways to counteract these threats. Social competences: Work in an interdisciplinary team. Ability to lead a team and expand team knowledge

Course objective

Learning the basic principles of building refrigeration, air conditioning and heating devices

Course-related learning outcomes

Knowledge:
1. Has knowledge of significant directions of development and the most important technical achievements and other related scientific disciplines, in particular transport engineering
2. Has basic knowledge of the life cycle of means of transport, both hardware and software, and in particular about the key processes taking place in them

Skills:
1. Can obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret and critically evaluate them, draw conclusions, and comprehensively justify their opinions
2.Can see in the process of formulating and solving tasks in the field of transport engineering also non-transport aspects, in particular social, legal and economic issues

Social competences:
Is aware of the importance of knowledge in solving engineering problems and knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Final tests

Programme content

Principles of construction of cooling, air-conditioning and heating devices used in means of transport in order to ensure appropriate temperature conditions. Characteristics of the basic components of refrigeration, air conditioning and heating devices (compressors, heat exchangers, valves, safety elements). Refrigerants. Environmental aspects of using refrigerants.

Course topics

air conditioning and refrigeration devices
Lecture content:
Thermodynamic processes in the Carnot cycle - efficiency of the cycle. Thermodynamic transformations in Linde cycles (wet and dry). Methods of improving efficiency in the Linde cycle. Design solution for multi-stage, indirectly cooled and cascade circuits. Requirements for refrigerants. Characteristics of selected refrigerants, lubricating oils and coolants. Construction of heat exchangers and throttling elements. Operation of refrigeration and air-conditioning equipment.
Laboratory exercises:
1. Temperature measuring devices.
2. Compressor refrigeration devices - structure and principle of operation.
3. Analysis of the operating parameters of a compressor refrigeration device. Assessment of circulation efficiency.
4. Construction of refrigeration compressors.
5. Testing the efficiency of the refrigeration unit.
6 Construction of automotive refrigeration units - structure and principles of operation.
7. Thermoelectric refrigeration devices - structure and principle of operation.

Teaching methods

Lecture with presentation, experimental classes

Bibliography

Basic
1. B. Gaziński Klimatyzacja pojazdów samochodowych, Systherm Serwis, Poznań 2016
2. B. Gaziński, Chłodnictwo dla praktyków, Systherm Serwis, Poznań 2013
3. S. Kwaśniowski, Pojazdy chłodnicze i izotermiczne, Nawigator, Wrocław 1997
Additional
1. K. Kalinowski, Amoniakalne urządzenia chłodnicze tom.1 i 2, Masta, Gdansk 2005

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00