



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Refrigeration in storage and transport

		Course
Field of study		Year/Semester
Mechanics and vehicle construction		2/2
Area of study (specialization)		Profile of study
Refrigerated vehicles		general academic
Level of study		Course offered in
Second-cycle studies		polish
Form of study		Requirements
full-time		compulsory

		Number of hours
Lecture	Laboratory classes	Other (e.g. online)
30	30	0
Tutorials	Projects/seminars	
15	0	
Number of credit points		
5		

		Lecturers
Responsible for the course/lecturer:		Responsible for the course/lecturer:
dr hab. inż. Krzysztof Bieńczak prof.PP		dr hab. inż. Arkadiusz Stachowiak, prof. PP
email:krzysztof.bienczak@put.poznan.pl		email: arkadiusz.stachowiak@put.poznan.pl
tel. 616655888		tel. 616652655
Wydział Inżynierii Lądowej i Transportu		Wydział Inżynierii Lądowej i Transportu
ul. Piotrowo 3, 60-965 Poznań		ul. Piotrowo 3, 60-965 Poznań

Prerequisites

Knowledge: The student has a general knowledge of the influence of technical objects and technologies on environment.

Skills: The student is able to define the categories of threats that constitute a specific threat to the environment technological process implemented in the area of production and operation of food machines i refrigeration equipment and indicate ways to counteract these threats.

Social competences: Working in an interdisciplinary team. Ability to lead a team i expanding team knowledge.



Course objective

Getting to know the theoretical and practical problems related to the construction and operation of facilities refrigeration.

Course-related learning outcomes

Knowledge

Has extended knowledge of thermodynamics and fluid mechanics to the extent necessary to understand the principle of operation and calculations of thermodynamic and flow processes occurring in working machines such as heating, cooling, drying, thermal and pressure agglomeration, etc., pneumatic transport, energy conversion, etc.

He has in-depth knowledge of the construction, principles of operation and classification of machines from a selected group.

He knows the main development trends in the field of mechanical engineering.

Skills

He can estimate the potential threats to the environment and people from the designed working machine and vehicle from a selected group.

Can plan and carry out experimental research of specific processes taking place in machines and routine tests of a working machine or a vehicle from a selected group of machines.

He is able to independently plan and implement his own learning throughout life and direct others in this regard.

Social competences

He is ready to critically assess his knowledge and received content.

It is ready to initiate actions for the public interest.

Is ready to fulfill professional roles responsibly, taking into account changing social needs, including:

- developing the professional achievements,
- maintaining the ethos of the profession,
- observing and developing the rules of professional ethics and acting towards the observance of these rules.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified on the basis of a written exam in the form of a test. The skills acquired during the exercises are verified on the basis of a final test in the form of a written test and mandatory individual reports on laboratory activities.

Programme content



Cooling systems used in large storage and freezing facilities. Refrigeration in seaports and on ships (cooler ships, hunting ships). Car refrigeration units. Transcritical systems in refrigerated vehicles. Hybrid aggregates. Preparation methods fruit and vegetables for transportation. Food storage and transport conditions (meat, fish, dairy products, fruit and vegetables) Condensers (classification, construction, operation). Evaporators (classification, construction, exploitation). regulators (classification, principle of operation, construction, operation). Fundamentals of the issue z the scope of cooling automation.

Teaching methods

Information and problematic lecture with a multimedia presentation. Exercises - solving tasks, laboratory (experiment) method.

Bibliography

Basic

1. B. Gaziński, Chłodnictwo dla praktyków, Systherm Serwis, Poznań 2013
2. S. Kwaśniewski, Pojazdy chłodnicze i izotermiczne, Nawigator, Wrocław 1997

Additional

1. B. Gaziński Klimatyzacja pojazdów samochodowych, Systherm Serwis, Poznań 2016

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	5,0
Classes requiring direct contact with the teacher	75	3,0
Student's own work (literature studies, preparation for tutorials, preparation for tests) ¹	45	2,0

¹ delete or add other activities as appropriate