



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Cooling and storage systems

### Course

Field of study

Construction and Exploitation of Means of Transport

Area of study (specialization)

Food Industry Machines and Refrigeration

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

prof. dr hab. inż. Krzysztof Bieńczak

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Faculty of Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

### Prerequisites

Knowledge: Has a general knowledge of the impact of technical facilities and technologies on the environment.

Skills: Can define the categories of threats to the environment of a specific technological process implemented in the area of production and operation of food machines and refrigeration devices and indicate ways to counteract these threats.

Social competences: Working in an interdisciplinary team. Ability to lead a team and expand team knowledge.



## Course objective

Understanding the theoretical and practical problems related to the construction and operation of refrigeration facilities

## Course-related learning outcomes

### Knowledge

1. 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 machines such as heating, cooling, drying, thermal and pressure agglomeration, etc., pneumatic transport, energy conversion, etc.
2. Has in-depth knowledge of the construction and principles of operation and classification of machines from a selected group.
3. Knows the main development trends in the field of machine construction.

### Skills

1. Can estimate the potential threats to the environment and people from the designed working machine and vehicle from a selected group.
2. Can independently plan and implement his own learning throughout life and direct others in this regard.

### Social competences

1. Is ready to critically assess the knowledge and content received.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written tests

## Programme content

Cooling systems used in large storage and freezing facilities. Refrigeration in sea ports and on ships (coolers, hunting ships). Car refrigeration units. Transcritical systems in transport refrigeration. Hybrid aggregates. Methods of preparing fruit and vegetables for transport. Food storage and transport conditions (meat, fish, dairy products, fruit and vegetables). Condensers (classification, construction, operation). Evaporators (classification, construction, operation). Regulators (classification, principle of operation, construction, operation).

## Teaching methods

lecture with presentation, experimental classes, blackboard exercises

## Bibliography

### Basic

1. B. Guziński, Chłodnictwo dla praktyków, Systherm Serwis, Poznań 2013



2. S. Kwaśniewski, Pojazdy chłodnicze i izotermiczne, Nawigator, Wrocław 1997

Additional

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

### Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam) <sup>1</sup>	45	1,5

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