COURSE DESCRIPTION CARD - SYLLABUS

Course name
Alternative methods of refrigerated transport [N2MiBP1-PCh>AMTCh]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
2/3

Area of study (specialization)
Refrigerated Vehicles

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
9

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

KNOWLEDGE: 1. The student has a basic knowledge of the basics of machine construction and the theory of machines and mechanisms, including mechanical vibrations. 2. The student is familiar with the latest trends in machine construction, ie automation and mechatronization, automation of machine design and construction processes, increased safety and comfort of operation, use of modern construction materials. 3. The student has an elementary knowledge of the impact of machines and technology on the natural environment and global energy balances. SKILLS: 1. The student is able to obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, as well as create and justify opinions. 2. The student is able to apply the basic technical standards concerning unification and safety and recycling. 3. The student is able to competently advise on the selection of a machine for a given application in the industry covered by the selected diploma path based on the acquired knowledge about a given group of machines. 4. The student is able to prepare and present a short verbal and multimedia presentation devoted to the results of the engineering task. SOCIAL COMPETENCE: 1. The student is ready to fulfill social obligations and co-organize activities for the social environment. 2. The student is ready to think and act in an entrepreneurial way.

Course objective

The aim of the course is to familiarize students with the most important issues concerning alternative methods of refrigerated transport to road transport - with particular emphasis on the construction and operation of rail, air and sea transport. For each of the presented methods and means of transport, the relevant international agreements regarding refrigerated transport (equivalent to the ATP agreement) and related standards are presented.

Course-related learning outcomes

Knowledge:
1. Has general knowledge of standardization, EU recommendations and directives, national industry and international standards systems and industrial standards.
2. 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.
3. Has extended knowledge of modern construction materials such as carbon plastics, composites, ceramics, in terms of their construction, processing technology and applications.

Skills:
1. Can design a technology of exploitation of a selected machine with a high degree of complexity.
2. Can write user manual and safety manual for designed work machine or vehicle.
3. Can estimate the cost of making a working machine or a vehicle with a high degree of complexity from a selected group of machines.

Social competences:
1. Is ready to fulfill social obligations, inspire and organize activities for the benefit of the social environment.
2. Is ready to initiate actions for the public interest.
3. Is ready to fulfill professional roles responsibly, taking into account the changing social needs, including:
- developing the achievements of the profession,
- 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:

Learning outcomes presented above are verified as follows:
Written credit.

Programme content

Agreements on the international transport of food by transport, rail, water and air. Classification and construction of containers for the transport of refrigerated products in rail, water and air transport. Means of transport used in rail, water and air transport of refrigerated products. Methodology of the organization of supply chains in methods of refrigerated transport alternative to road transport.

Course topics

none

Teaching methods

Lecture: multimedia presentations; Exercises: solving problems

Bibliography

Basic
1. Kierstan M., Heap R., Ford G., Food transportation, Springer US, 1998;

2. Ryan J.M., Guide to Food Safety and Quality During Transportation, Academic Press, 2014;
3. Wojewódzka-Król K., Załoga E., Transport - nowe wyzwania, PWN, 2016;
4. Grzybowski L., Łączyński B., Narodzonek A., Puchalski J., Kontenery w transporcie morskim, Trademar 1997;
5. Bartosiewicz A., Transport morski kontenerów. Rola i znaczenie intermodalnych terminali przeładunkowych, Wyd. Uniwersytetu Łódzkiego, 2020.
Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	9	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	16	0,50