



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Food industry engineering

### Course

Field of study

Construction and Exploitation of Means of Transport

Area of study (specialization)

Food Industry Machines and Refrigeration

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

9

Laboratory classes

18

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr.inż. Wojciech Ratajczak

Responsible for the course/lecturer:

Faculty of Civil and Transport Engineering

### Prerequisites

Basic knowledge of thermodynamics, mechanics, fluid mechanics and economics. The student has the ability to carry out basic thermodynamic-flow calculations. He can analyze technological schemes. Is independent at work, but can also work in a group.

### Course objective

Understanding the principles of rational sourcing, processing, transport, distribution and use of energy. Acquiring knowledge in the field of operation and balancing of energy systems. Getting to know the principles of energy audit and analysis of practical examples. To acquaint students with the main ecological threats related to the operation of energy systems. Indication of the necessity to save primary energy sources..

### Course-related learning outcomes

Knowledge

Expanding knowledge in the field of heat management in a production plant. Knowledge of energy processing, accumulation and storage systems. Understanding associated processes and systems for the



conversion of energy derived from renewable resources. Basic knowledge necessary to analyze costs in the energy economy.

#### Skills

Has the ability to optimize the thermal management in the plant. He can calculate the indices of unit energy consumption in a food industry plant and prepare energy balances of devices. He can estimate the potential threats to the natural environment related to the use of industrial technologies.

#### Social competences

1. Understanding the need to deepen and update knowledge and the possibility of implementing them.
2. Awareness of social aspects of energy saving.
3. Entrepreneurship in thinking and acting.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by one 45-minute test carried out during the 8th lecture. The test consists of 4 open-ended questions with different scores. Passing threshold: 50% of points. Final issues, on the basis of which the questions are developed, will be sent to students by e-mail. The skills acquired during the laboratory classes are verified on the basis of the obligatory reports from the laboratory classes and a 30-minute credit test during the last classes, consisting of 3 questions. Passing threshold: 50% of points.

#### Programme content

Directions of energy economy development in industry. Characteristics and use of fuels. Structure and energy consumption of energy in food industry plants. Heat and power plants. Associated processes and systems for the conversion of energy derived from renewable resources. Heat management: steam, steam boilers, steam generators. Characteristics of energy accumulation and storage systems. Tasks for saving energy. Benefits of saving energy. Energetic audit. Calculation of specific energy consumption indicators in the food industry.

#### Teaching methods

1. Lecture with multimedia presentation.
2. Practical laboratory exercises

#### Bibliography

##### Basic

1. Szargut. J., Termodynamika techniczna, Wyd. P. Śl. 2011
2. Tuliszka E., Termodynamika techniczna. Zbiór zadań. Nr 889, Wyd. PP
3. Górzyński J. Audyting energetyczny, Biblioteka Fundacji Poszanowania Energii, 2000



Additional

1. Szymański W., Wolańczyk F.. red., Termodynamika powietrza wilgotnego, Oficyna wydawnicza Politechniki Rzeszowskiej, 2008

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
,0Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	20	1,0

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