



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Refrigeration for Air Conditioning [N1IŚrod1>ChdK]

Course

Field of study

Environmental Engineering

Year/Semester

4/7

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

10

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

10

Number of credit points

2,00

Coordinators

dr inż. Andrzej Odyjas

andrzej.odyjas@put.poznan.pl

Lecturers

Prerequisites

He has basic knowledge about the parameters of climatic comfort, determination of loads for ventilation. He knows the processes of thermodynamic air preparation in devices and air handling units. Has knowledge of basic refrigeration cycles. Ability to perform mathematical transformations, derivations of mathematical formulas. Has the ability to read charts for refrigerants. The student should be aware of the consequences of decisions made. Be aware of the necessity constantly updating and supplementing knowledge and skills.

Course objective

Acquiring knowledge and skills in the field of refrigeration for air conditioning, necessary to design processes and technological systems, conduct pre-design analyzes of processes and equipment used in refrigeration.

Course-related learning outcomes

Knowledge:

1. The student knows the basic structures of air conditioning and refrigeration systems for air conditioning used in construction.

2. Has knowledge in the selection of refrigeration pipelines, chillers, condensers, air conditioners..
3. Has general knowledge of developing the concept of the structure of the refrigeration system in systems air-conditioning systems for a room/building and knows the basic structures of control systems refrigeration systems for air conditioning.

Skills:

1. The student is able to determine the calculation parameters of basic refrigeration systems for air conditioning
2. Can perform calculations in the selection of components of a simple refrigeration system for a selected case
3. Can choose a cooling system with direct expansion of the refrigerant for the selected case
4. Can use the catalogs of device manufacturers and select devices for the cooling system based on diagrams or selection programs.

Social competences:

1. The student is aware of the influence of the cooling system on the operation of the air-conditioning system.
2. Is aware of the need to systematically deepen and expand their competences.
3. Is aware of the importance of air conditioning as a technical element of building equipment affecting human health, safety and productivity.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures:

Written test with open questions of different types.

Rating scale: 0-50%: 2.0; 51-60%: 3.0; 61-70%: 3.5; 71-80%: 4.0; 81-90%: 4.5; 91-100%: 5.0. "

Tutorials:

The final grade takes into account the completeness of the project and the written test.

A minimum of 50% points must be obtained to pass.

Programme content

Lectures:

1. Methods of cooling air and air-conditioned rooms.
2. Refrigeration cycles used in air conditioning, refrigerants and coolants, transformations in refrigeration devices.
3. Compressor and absorption refrigeration cycles.
4. Components of refrigeration equipment and systems. Refrigerants, including ecological ones.
5. Chillers for air conditioning.
6. Heat pumps used in air conditioning.

Project:

Individual design of a compressor refrigeration system powering an air-conditioning unit for a project with air conditioning. The design takes into account the transformation of the refrigerant, the selection of equipment, pipelines and system equipment, as well as drawings, diagrams and a list of materials.

Teaching methods

Lectures:

Informative lecture with elements of a conversational lecture; Multimedia presentation; Problem lecture

Project:

Individual work on the project; Case study discussion; Consultations; Case study analysis;

Bibliography

Basic:

[1] Recknagel H., Sprenger E., Schramek E.R.: Kompendium wiedzy: ogrzewnictwo, klimatyzacja, ciepła woda, chłodnictwo, Wydawnictwo Omni Scała, Wrocław 2008

[2] Pelech A.: Wentylacja i klimatyzacja - podstawy. Oficyna Wydawnicza Politechniki Wrocławskiej.

Wrocław 2008.

[3] Pelech A., Szczęśniak S.: Wentylacja i klimatyzacja. Zadania z rozwiązaniami i komentarzami. Oficyna Wydawnicza Politechniki Wrocławskiej. Wrocław 2012.

[4] Lipska B.: Projektowanie wentylacji i klimatyzacji. Podstawy uzdatniania powietrza. Wydawnictwo Politechniki Śląskiej Gliwice 2012.

[5] Malicki M.: Wentylacja i klimatyzacja. PWN Warszawa 1980.

[6] Jones W.P.: Klimatyzacja. ARKADY. Warszawa 2001.

Additional:

[1] Gaziński B.: Technika klimatyzacyjna dla praktyków. Komfort cieplny, zasady obliczeń i urządzenia. Systherm Serwis. Poznań 2005.

[2] Baumgarth, Horner, Reeker: Poradnik Klimatyzacji. Tom 1: Podstawy. Wydanie 1 polskie na podstawie 5 zmienionego i rozszerzonego wydania niemieckiego. Systherm, Poznań 2011.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	20	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00