COURSE DESCRIPTION CARD - SYLLABUS

Course name
Energetics of chemical processes [S2IChiP1-IC>EPC]

Course

Field of study
Chemical and Process Engineering

Year/Semester
1/2

Area of study (specialization)
Chemical Engineering

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
15

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Students: have basic knowledge in thermodynamics, engineering and chemical technology obtained during the first-cycle studies. can apply the learned mathematical apparatus and knowledge in physics to physicochemical calculations. are aware of further development of their competences.

Course objective

To familiarise students with the methods necessary to manage energy flow in chemical processes.

Course-related learning outcomes

Knowledge:
students will have advanced knowledge of energy and its flows. k_w03, k_w04
students will have sufficient knowledge to manage energy flows in chemical processes. k_w03, k_w04

Skills:
students will be able to obtain information from literature, databases and other sources; interpret it as well as draw conclusions and formulate and substantiate opinions. k_u01
students will be able to formulate and solve tasks related to the flow of energy in chemical processes.

k_u09

Social competences:
students will be aware of the responsibility for jointly performed tasks. they will be able to work as a team. k_k03

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: assessment based on project classes.
Projects: The summary final grade for the project classes will be issued on the basis of the average grade for the preparation of the project and its presentation.
If the classes will be held remotely, the forms of course assessments will remain unchanged and will be carried out with the use of tools provided by the Poznań University of Technology (the e-courses platform).

Programme content

Lecture and projects:
Chemical reaction energetics. Energy exchange. Supply of energy necessary for the synthesis of low-energy compounds. Photochemistry. Photosynthesis. Supplying energy in the form of work. Exothermic reaction energy - discharge and management. High temperature processes (metallurgy, ceramics, sinters, aluminum electrolysis). High-energy compounds. Fuel. Liquefaction or gasification of solid fuels. Oxidants. Energy losses when converting fuels. High and low temperature combustion. Waste heat. Co-generation of work and heat. Comparison of the efficiency of various "energy production" processes. Heat energy accumulators, "cold" accumulators. Accumulation of electricity.

Teaching methods

Lecture: multimedia presentation
Projects: collecting materials, preparing a project on a selected topic and delivering it.

Bibliography

Basic
1. J. Szarawara, Termodynamika chemiczna stosowana, WNT, Warszawa 2007
2. E. Grzywa, J. Molenda, Technologia podstawowych syntez chemicznych, WNT, Warszawa 2000
3. R. Dylewski, W. Gnot, M. Gonet, Elektrochemia przemysłowa, Wydawnictwo Politechniki Śląskiej 1999
Additional
1. R.S. Berry, S.A. Rice, J. Ross, Physical Chemistry, Oxford University Press, 2010

Breakdown of average student's workload

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