COURSE DESCRIPTION CARD - SYLLABUS

Course name

Podstawy technologii chemicznej (Fundamentals of Chemical Technology)

Course

Field of study

Technologia chemiczna (Chemical Technology)

Year/Semester

III/6

Area of study (specialization)

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

20

Laboratory classes

40

Other (e.g. online)

Tutorials

0

Projects/seminars

0

Number of credit points

7

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Basic knowledge of general and organic chemistry, physical chemistry, thermodynamics and chemical engineering; ability to solve elementary problems in the field of chemical technology, including the ability to assess the possibility of implementing the process on an industrial scale and control its course, and analysis of its impact on the natural environment; the ability to obtain information from indicated sources;

Course objective

Obtaining theoretical and practical knowledge in the field of creating a technological project; material balance and energy balance of processes; calculating of homogeneous chemical reactors.

Course-related learning outcomes

Knowledge

K_W03 - student has the necessary knowledge of chemistry to enable understanding of chemical phenomena and processes

K_W09 - student has the necessary knowledge about both natural and synthetic raw materials, products and processes used in chemical technology, as well as about the directions of development of the chemical industry in the country and in the world

K_W12 - student knows the principles of construction, operation and selection of devices, reactors and apparatus used in chemical technology

Skills

K_U01 - can obtain the necessary information from literature, databases and other sources related to chemical sciences; correctly interprets them, draws conclusions, formulates and justifies opinions

K_U03 - can prepare technological documentation, communicate using various techniques in a professional environment

K_U18 - distinguishes between types of chemical reactions and has the ability to select them for chemical processes

K_U26 - assesses the risk associated with increasing the scale of chemical operations and processes

K_U33 - solves simple engineering tasks related to the implementation of processes and unit operations in chemical technology

Social competences

K_K01 - understands the need for further training and raising their professional competences

K_K02 - is aware of the importance and understanding of non-technical aspects and effects of engineering activities, including its impact on the environment

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written/oral exam graded on the basis of a points system (0-100 points)

3	50,1 -70,0 points
4	70,1 -90,0 points
5	90,1 -100 points

assessment of student's activity in laboratory classes, assessment of teamwork and the ability to solve scientific problems

Programme content

The lectures cover the following topics:

1. Stages of creating a technological project.

2. Chemical process concept

a) stoichiometric analysis of the process (basic concepts, mass balance of the reaction);

b) thermodynamic analysis of the process (thermodynamic data sources, chemical equilibrium constant and thermodynamic potential, calculation of post-reaction mixture composition,

calculation of the reaction equilibrium constant)

c) kinetic analysis of the process (speed of chemo-technological process and chemical reaction, speed of homogeneous reaction, temperature effect, pressure effect, kinetic curves).

3. Technological concept of the process (technological principles and principles of green chemist

4. Increasing the scale of the process (semi-technical scale, semi-technical scale, pilot plant)

5. Technological scheme (process schematic diagram, mass balance, energy balance).

6. Enthalpy graphs (stoichiometric process).

7. Classification of chemical reactors and calculation methods for basic types of homogeneous reactors.

Teaching methods

Lecture: multimedia presentation illustrated with examples shown on a blackboard.

Laboratory classes - practical exercises.

Bibliography

Basic

1. skrypt „Podstawy technologii chemicznej i inżynierii reaktorów”, pod red. M. Wiśniewskiego, K. Alejskiego, Wydawnictwo Politechniki Poznańskiej, Wydanie II, Poznań 2017.

2. A. Burghardt, G. Bartelmus, Inżynieria reaktorów chemicznych, PWN Warszawa 2001.

2. E. Bortel, H. Konieczny, Zarys technologii chemicznej, Warszawa, WNT 1992.

3. J. Szarawara, J. Skrzypek, A. Gawdzik, Podstawy inżynierii reaktorów, Warszawa, WNT 1980niowe z kinetyki chemicznej i adsorpcji z elementami katalizy, Wydawnictwo Politechniki Śląskiej 2010

Additional

1. P.W. Atkins, Chemia fizyczna, Wyd. Nauk. PWN, Warszawa 2003.

2. S. Bretsznajder, Podstawy ogólne technologii chemicznej, Warszawa, WNT 1973.

3. Handbook of Petroleum Technology,Springer International Publishing AG, 2017.

Breakdown of average student's workload

	Hours	ECTS
Total workload	175	7,0
Classes requiring direct contact with the teacher	75	3,0
Student's own work (literature studies, preparation for tests/exam, project preparation) [1]	100	4,0

[1] delete or add other activities as appropriate