COURSE DESCRIPTION CARD - SYLLABUS

Course name
Purification processes

Course

Field of study
Chemical and Process Engineering
Area of study (specialization)
Chemical Engineering
Level of study
Second-cycle studies
Form of study
full-time

Year/Semester
1/1
Profile of study
general academic
Course offered in
Polish
Requirements
compulsory

Number of hours

Lecture
15
Laboratory classes
45
Other (e.g. online)

Tutorials
Projects/seminars

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
Sylwia Włodarczak Eng, PhD

Responsible for the course/lecturer:
Jacek Różański Eng, PhD, DSc

Marek Ochowiak Eng, PhD, DSc

Prerequisites

As preliminary requirements the student should have a basic knowledge of the kinetics of heat and mass transfer processes, construction and operating principles of process apparatus, mathematical analysis and process control.

Course objective

The aim of the course is to acquaint the student with the practical course of diffusion-thermal and

mechanical processes for the purification of gases, liquids and solids that occur in both the chemical industry and environmental protection. The subject is mainly focused on expanding practical skills.

Course-related learning outcomes

Knowledge

1. Has extended knowledge of diffusion-thermal and mechanical processes for the purification of gases, liquids and solids important from the point of view of chemical engineering and environmental protection. K_W4, K_W9

Skills

1. Is able to plan the process of separating mixtures and carry it out based on previously performed theoretical calculations. K_U9, K_U19

2. Is able to choose the appropriate conditions for conducting the process in order to achieve the desired efficiency of mixture separation. K_U19

3. On the basis of the analysis of pollutant type and concentration, he is able to correctly select the apparatus for gas/liquid stream purification. K_U18

4. Is able to perform and utilize computer image analysis to determine the shape and size of solid particles. K_U7

5. Has teamwork skills and is aware of the security principles. K_U15

6. Has the ability to present research results in the form of a report. K_U6

7. Is able to critically evaluate the results of experimental research. K_U18

Social competences

1. Is aware of the responsibility for teamwork and taking responsibility for it. K_K5

2. Has formed awareness of the limitations of science and technology related to environmental protection. K_K2

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The exam covers the solution of 5 open tasks related to the issues discussed in the lecture. It is allowed to carry out pass the exam in a remote form depending on the epidemic situation. The pass threshold score is 51%.

Laboratory: Completion of the laboratory consists of obtaining a credit for:

1. Colloquium. The test includes 4-6 open questions from the theory to the exercises performed and their course. It is allowed to carry out pass the test in a remote form depending on the epidemic situation. The pass threshold score is 51%.

2. Performing all laboratory exercises provided for in the study program.

3. Obtaining credit for reports on the exercises performed.

Programme content

As part of the classes, the following are discussed:

• processes and equipment used in water and wastewater treatment,

• processes and equipment used in air purification,

• liquid atomization

• simple distillation,

• periodic rectification,

• mass transfer coefficient in the process of aeration of liquids,

• sieve analysis,

• foam separation,

• ion exchange,

• computer analysis of dust particle images.

Teaching methods

Multimedia presentation, laboratory exercises, student book.

Bibliography

Basic

1. L. Broniarz-Press, P. Agaciński, M. Ochowiak, J. Różański.: Procesy oczyszczania, Wydawnictwo Politechniki Poznańskiej, Poznań, 2011.

2. Ochowiak M., Broniarz-Press L.: Inżynieria procesów ochrony środowiska, Wyd. Politechnikii Poznańskiej, Poznań, 2012.

3. Bandrowski J., Merta H., Zioło J.: Sedymentacja zawiesin. Zasady i projektowanie, Wydawnictwo Politechniki Śląskiej, Gliwice, 2001.

4. Bandrowski J., Troniewski L.: Destylacja i rektyfikacja, Wydawnictwo Politechniki Śląskiej, Gliwice, 1996.

5. Warych J.: Oczyszczanie gazów. Procesy i aparatura, WNT, Warszawa, 1998.

6. Zarzycki R.: Wymiana ciepła i ruch masy w inżynierii środowiska, WNT, Warszawa, 2005.

7. Orzechowski Z., Prywer J.: Wytwarzanie i zastosowanie rozpylonej cieczy, Wydawnictwa Naukowo-Techniczne, Warszawa 2008

Additional

1. Broniarz-Press L. i inni: Inżynieria Chemiczna i Procesowa. Materiały Pomocnicze. I. Reologia techniczna i procesy przenoszenia pędu, Wydawnictwo Politechniki Poznańskiej, Poznań, 1999

2. Broniarz-Press L. i inni: Inżynieria Chemiczna i Procesowa. Materiały Pomocnicze. II. Procesy wymiany ciepła, Wydawnictwo Politechniki Poznańskiej, Poznań, 2001

3. Broniarz-Press L. i inni: Inżynieria chemiczna i procesowa. Materiały pomocnicze. III. Procesy wymiany masy, Wydawnictwo Politechniki Poznańskiej, Poznań, 2005

4. Selecki A., Gawroński R.: Podstawy projektowania wybranych procesów rozdzielania mieszanin, WNT, Warszawa, 1992

5. Hobler T.: Dyfuzyjny ruch masy i absorbery, WNT, Warszawa, 1976.

6. Hobler T.: Ruch ciepła i wymienniki, WNT, Warszawa, 1986.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for laboratory classes, preparation for test, reports preparation) [1]	65	2,5

[1] delete or add other activities as appropriate