COURSE DESCRIPTION CARD - SYLLABUS

Course name
Processes of gas and liquid purification [S1IChiP1>POGiC]

Course

Field of study
Chemical and Process Engineering

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

principles of process equipment; principles of chemical engineering; principles of fluid mechanics; basis of physical chemistry; selection of process equipment; calculation of process equipment; The student knows the limits of his knowledge and sees the need to deepen their knowledge.

Course objective

Obtaining knowledge in the field of mass balance of gas and liquid purification processes as well as interfacial equilibria

Course-related learning outcomes

Knowledge:
1. the graduate knows the basic methods of gas and liquid purification processes [k_w13, k_w14]
2. the graduate knows the principles of interfacial equilibria - [k_w13, k_w14]

Skills:
1. the graduate can calculate mass and heat balances for distillation and rectification as well as extraction, filtration crystallisation and sedimentation - [k_u16]

2. the graduate can determine interfacial equilibrium - [k_u19]

Social competences:
1. the graduate understands the need to develop and improve his/her professional and personal competencies. - [k_k01]
2. the graduate knows the limits of his own knowledge and understand the need for continuing of education. - [k_k01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
The knowledge acquired as the lectures is verified in the form of test consisting of solving tasks. Test could be performed also in remote mode using eKursy platform. Test consists of 2-3 tasks, differently scored. The credit threshold is 50%. The test takes place at the penultimate classes and the correctional test on the last. In the case of remote mode, students are required to turn on the camera. The solutions of the tasks are manually entered into the prepared activity of the course in the form of scans or photos of the solution cards.
The skills acquired during the project classes are verified in the form of defense taking place during the last and penultimate classes or defense conducted remotely. The final grade is the sum of partial marks for documentation and an oral response to the questions asked. The pass mark is 50%. In the case of remote defense, students are required to turn on the camera and microphone.

Programme content

fundamentals of phase equlibrium VLE, VLEE, gas-liquid, basic parameters describing the purification; mass balance for batch distillation, mass balance for continuous distillation, mass balance for flash distillation, methods for determining the number of theoretical trays, the mass balance of extraction, methods for determining extraction stages, rules for plotting ternary plots, rules for determination of tie lines, methods for determining the amount of solvent, mass balance of crystallization, types of nucleation, crystal growth rate, crystal population balance, filtration mass balance with constant flow rate and constant pressure; basics of mass balance of sedimentation, mass balance of sedimentation centrifuges

Course topics

Issues related to balancing gas and liquid purification processes as well as interphase equilibria.

Teaching methods

Multimedia presentation, presentation illustrated with examples on the table, and resolving tasks provided by the lecturer

Bibliography

Basic
1. Ziółkowski Z., Destylacja i rektyfikacja w przemyśle chemicznym, WNT, Warszawa 1978
2. Bandrowski J., Troniewski L., Destylacja i rektyfikacja, Wydawnictwo Politechniki Śląskiej, Gliwice, 1980,
3. Ziołkowski Z. Ekstrakcja cieczy wprzemyśle chemicznym, WNT Warszawa 1980
4. P.M. Synowiec, Krystalizacja przemysłowa z roztworu, WNT Warszawa 2008
5. J. Bandrowski, H. Merta, J.Zioło, Sedymentacja zawiesin. Zasady i projektowanie, Wydawnictwo Politechniki Śląskiej, Gliwice, 2001
6. R. Błażejewski, Sedymentacja cząstek ciała stałego, PWN, 2015
7. R. Koch, A. Noworyta, procesy mechaniczne w inżynierii chemicznej, WNT, Warszawa 2004.
Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	55	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00