STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Gas and liquid purification processes	**1010701131010720519**

Field of study	Profile of study (general academic, practical)	Year /Semester
Chemical and Process Engineering	**general academic**	**3 / 5**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time, part-time)
First-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **30** Classes: **-** Laboratory: **-** Project/seminars:	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
basic	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
Technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	- principles of process equipment - principles of chemical engineering - principles of fluid mechanics - basis of physical chemistry
2	**Skills**	- selection of process equipment - calculation of process equipment
3	**Social competencies**	- The student knows the limits of his knowledge and sees the need to deepen their knowledge.

Assumptions and objectives of the course:

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

Study outcomes and reference to the educational results for a field of study

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_U15, K_U16, K_U21]**
2. The graduate can determine interfacial equilibrium **- [K_U15, K_U16, K_U21]**

Social competencies:

1. The graduate understands the need to develop and improve his/her professional and personal competencies. - **[K_K01; K_K02]**
2. The graduate knows the limits of his own knowledge and understand the need for continuing of education. - **[K_K01; K_K02]**

Assessment methods of study outcomes
Knowledge Test (multiple-choice test) – 1-2 **Skills** Test – 1-2 **Social competencies** Test – 1-2

Course description
During the course are discussed: 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

Basic bibliography:

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 bibliography:

Result of average student's workload

Activity	**Time (working hours)**
1. Participation in lectures	30
2. Participation in consultation	10
3. Preparation for the exam	15

Student's workload

Source of workload	**hours**	**ECTS**
Total workload	45	2
Contact hours	30	1
Practical activities	0	0