COURSE DESCRIPTION CARD - SYLLABUS

Course name
Selected aspects of chemical equilibrium [S1TCh2>WSRC]

Course

Field of study
Chemical Technology

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
0

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

1. A student has basic knowledge of mathematics to the extent that enables the use of mathematical methods to describe chemical issues and processes and to perform calculations needed in engineering activities. 2. A student has basic knowledge of chemistry to enable understanding of chemical phenomena and processes. 3. A student has basic knowledge of products and processes used in chemical technology. 4. A student has the ability to use Excel in the field of calculations and graphs. 5. A student understands the need for further training and raising his professional and personal competences, is able to interact and work in a group, is able to think and act in a creative and entrepreneurial way.

Course objective

Extending knowledge of the fundamentals of chemical technology with issues related to chemical equilibrium, the impact of various parameters on the reaction equilibrium, and the rate of complex reactions.

Course-related learning outcomes

Knowledge:
1. A student has knowledge in the field of technology and chemical engineering. [K_W13]
2. A student knows the basic methods, techniques, tools and materials used to solve simple tasks in the field of technology and chemical engineering - simulation of chemical reaction with distillation (reactive distillation). [K_W15]

Skills:
1. A student is able to obtain the necessary information from literature, databases and other sources related to chemical sciences, correctly interprets it, draws conclusions, formulates and justifies opinions. [K_U01]
2. A student can work both individually and as a team member. [K_U02]
3. A student is able to prepare and present in Polish or English an oral presentation on exercises in the fundamentals of chemical technology. [K_U04]
4. A student uses computer programs (Excel, RECTIFICATION) supporting the implementation of tasks typical for chemical technology and engineering, examines the course of chemical processes and properly interprets the results obtained. [K_U07]
5. A student, when formulating and solving tasks, can see their systemic and non-technical aspects. [K_U09]

Social competences:
1. A student understands the need for further training and raising their professional, personal and social competences. [K_K01]
2. A student can interact and work in a group. [K_K03]
3. A student is able to properly set priorities for the implementation of the task. [K_K04]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Ongoing control of calculations and simulation results, presentation of simulation results by students in Power Point presentations. Grade of presentation in scale 2,0-5,0. Colloquium on calculations related to chemical equilibrium.Written assingment including solving three problems regarding equilibrium of chemical reaction; the following grading scale is applied:
2.0 below 51%
3,0 51-60%
3,5 61-70%
4,0 71-80%
4,5 81-90 %
5,0 91-100%
The final grade is the average of the grades obtained from presentation and colloqium.
In the case of mandatory online teaching the course will be available in eKursy platform and analogous methods for veryfing learning outcomes and assesment criteria will be applied.

Programme content

Issues related to chemical equilibrium, and the rate of complex reactions.

Course topics

Classes include issues related to chemical equilibrium, the impact of various parameters on the change of equilibrium - on the example of a simulation of chemical reaction with distillation (reactive distillation) using a computer program RECTIFICATION. Classes also include calculation exercises in the field of chemical equlibrium and/or the rate of complex reactions.

Teaching methods

Team work, computer simulations, problem solving, presentation of results, discussion

Bibliography

Basic:
1. Z. Ziołkowski, Destylacja i rektyfikacja w przemyśle chemicznym, WNT, Warszawa 1978.

2. T. Ufnalski, Równowagi chemiczne, WNT, Warszawa 1995.
3. J. Szarawara, J. Piotrowski, Podstawy teoretyczne technologii chemicznej, WNT, Warszawa 2010.
4. S. Bretsznajder, Podstawy ogólne technologii chemicznej, WNT, Warszawa 1973.
e-zasoby Biblioteki PP, e-book database Knovel:
1. O. Levenspiel, Chemical Reaction Engineering, Wiley&Sons, USA 1999.
2. A. Kayode Coke, Ludwig's Applied Process Design for Chemical and Petrochemical Plants, Volume 2 (4th Edition), Elsevier, USA 2010.

Additional:
1. K. Alejski, I. Miesiąc, K. Prochaska, M. Regel-Rosocka, A. Sobczyńska, J. Staniewski, K. Staszak, M. Staszak, M. Wiśniewski, Podstawy technologii chemicznej i inżynieria reaktorów. Część I i II. Pod redakcją M. Wiśniewskiego i K. Alejskiego, Wyd. Politechniki Poznańskiej, Poznań 2017.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50