COURSE DESCRIPTION CARD - SYLLABUS

Course name
Heat and mass transfer processes [S1TCh2>PWCiM]

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 (e.g. online)
0

Tutorials
0

Projects/seminars
30

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Students starting this subject should have basic knowledge in mathematics, physics, chemistry, statistics, engineering graphics, physical chemistry, thermodynamics, and materials technology. They should also have the ability to use spreadsheets, performing statistical analysis of measurement results and be ready to work in a team.

Course objective

The aim of the course is to provide the ability to perform design calculations.

Course-related learning outcomes

Knowledge:
1. Student knows the fundamental methods of scale-up - [K_W13]

Skills:

1. Student can to design equipments where momentum, heat and mass transfer take place - [K_U15]

Social competences:
1. The student can cooperate and work in a team [K_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The skills acquired during project classes are verified on the basis of a colloquium (3 tasks with the same score (5 points), grading scale: up to 7.5 - unsatisfactory; from 8.0 to 9.0 - sufficient; from 9.5 to 10 .5 - sufficient plus; from 11.0 to 12.0 - good; from 12.5 to 13.5 - good plus; from 14.0 - very good), documentation of the completed project and defense of the project. All partial unsatisfactory grades must be corrected to a positive grade. A project with a serious error must be corrected (the teacher decides whether the error requires correction of the project). The final grade will be given as follows: (1) the arithmetic mean will be calculated from all the grades received for the colloquium, (2) the arithmetic mean will be calculated from all the grades received for the project and for project defense. The two arithmetic means obtained in this way will be summed up and divided by two, and the final grade will be issued according to the following scale: (up to 2.74 - insufficient; from 2.75 to 3.24 - sufficient; from 3.25 to 3.74 - sufficient plus; from 3.75 to 4.24 - good; from 4.25 to 4.74 - good plus; from 4.75 - very good). The remote completion of the project will be carried out on the same terms via the eMeeting platform or another platform recommended by the Poznań University of Technology.

Programme content

Course covers the following topics:
1. Convective heat and mass transfer
2. Condensation
3. Overall heat transfer coefficient
4. Calculation of heat transfer area
5. Mass balances
6. Overall mass transfer coefficient

Course topics

none

Teaching methods

Multimedia presentation, illustrated with tasks solved on the board.

Bibliography

Basic:
1. Zarzycki R.: Wymiana ciepła i ruch masy w inżynierii środowiska, WNT, Warszawa 2005.
2. Wiśniewski S., Wiśniewski T.S., Wymiana ciepła, WNT, Warszawa 2012.
3. Hobler T.: Dyfuzyjny ruch masy i absorbery, WNT, Warszawa 1976.
4. Hobler T.: Ruch ciepła i wymienniki, WNT, Warszawa 1986.
5. Koch R., Kozioł A., Dyfuzyjno-cieplny rozdział substancji, WNT, Warszawa 1994.
6. Palica M., Gierczycki A., Lemanowicz M., Operacje inżynierii chemicznej, część 1 i 2, Wydawnictwo Politechniki Śląskiej, Gliwice 2013.
7. Broniarz-Press L. i inni: Inżynieria Chemiczna i Procesowa. Materiały Pomocnicze. Części II-III. Wydawnictwo Politechniki Poznańskiej, Poznań 1999-2005.
8. Bandrowski J., Troniewski L.: Destylacja i rektyfikacja, Wyd. Politechniki Śląskiej, Gliwice 1996.

Additional:
1. Coulson J.M., Richardson J.F.: Chemical Engineering, vol. I-VI, Butterworth Heinemann, Oxford 1999-2002.
2. Sinnott R.K. Towler G.: Chemical Engineering Design, 5th Edition, Elsevier, 2009.
3. Pohorecki R., Wroński S.: Termodynamika i kinetyka procesów inżynierii chemicznej, WNT, Warszawa 1977.
4. Troniewski L.: Hoblerowskie ujęcie ruchu masy, Wydawnictwo WSI, Opole 1996.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00