COURSE DESCRIPTION CARD - SYLLABUS

Course name
Heat and mass transfer processes [S1TCh2E>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
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other
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, engineering graphics, and materials technology. They should also have the ability to use spreadsheets, 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. The student has the necessary knowledge in the selection of construction materials used in the construction of devices, apparatus and chemical installations and knows the principles of their operation [K_W04]
2. The student knows the principles of construction, operation and selection of devices, reactors and apparatuses used in chemical technology [K_W12]
3. The student knows the basic methods, techniques, tools and materials used to solve simple tasks in the field of technology and chemical engineering [K_W15]

Skills:
1. The student is able to work both individually and as a team in a professional and other environment [K_U02]
2. The student is able to use mathematical knowledge to simulate, design, optimize and characterize simple chemical processes and unit operations [K_U08]
3. The student is able, in accordance with the given specification, to design simple devices, apparatuses, objects, systems or plan processes typical for chemical technology, using appropriate methods, techniques and tools [K_U15]

Social competences:
1. The student is able to cooperate and work in a group, inspire and integrate engineering environments [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

Issue related to heat and mass transfer processes.

Course topics

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. Overall mass transfer coefficient

Teaching methods

Multimedia presentation, illustrated with tasks solved on the board.

Bibliography

Basic:
1. Serth R.W., Lestina T.G., Process Heat Transfer, Principles, Applications and Rules of Thumb, Elsevier, 2nd edition, 2014
2. Coulson J.M., Richardson J.F.: Chemical Engineering, vol. I-VI, Butterworth Heinemann, Oxford 1999-2002.
3. Manglik Raj, Heat Transfer Fluid Flow Data Books, Genium Publishing Corporation, 2015
4. André B. de Haan, Hans Bosch, Industrial Separation Processes, Fundamentals, Walter de Gruyter GmbH, Berlin/Boston, 2013
5. Richardson J.F., Harker J.H., Backhurst J.R., Chemical Engineering Volume 2 - Particle Technology and Separation Processes (5th Edition), Elsevier, 2002
6. Kothandaraman C.P., Fundamentals of Heat and Mass Transfer, New Age International Ltd. Publisher,

2006

Additional:
1. Hobler Tadeusz., Mass Transfer and Absorbers, 1st edition, International Series of Monographs in Chemical Engineering, 1966
2. Sinnott R.K. Towler G.: Chemical Engineering Design, 5th Edition, Elsevier, 2009.

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