COURSE DESCRIPTION CARD - SYLLABUS

Course name
Process equipment [S1IChiP1>AP1]

Course

Field of study
Chemical and Process Engineering

Year/Semester
2/3

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
15

Projects/seminars
0

Number of credit points

3,00

Coordinators

dr hab. inż. Szymon Woziwodzki prof. PP
szymon.woziwodzki@put.poznan.pl

Lecturers

Prerequisites

basics math, physics and chemistry; principles of design documentation; basis of materials science and mechanical engineering; ability to use calculation software; The student is aware of the advantages and limitations of individual and group work in solving the problems of an industrial nature and design; The student knows the limits of his knowledge and sees the need to deepen their knowledge.

Course objective

Obtaining knowledge about equipment used in unit operations performed in the chemical and related industries. the student acquires the ability to read and understand and create simple flowsheet, as well as basic calculations of selected process equipment.

Course-related learning outcomes

Knowledge:
1. knowledge of the basic types of apparatus used in processes for the exchange of momentum, heat, mass, and other. - [k_w12, k_w15]
2. knowledge of graphic symbols of equipment and machinery used in the creation of technological schemes in accordance with pn en iso 10628h. - [k_w12, k_w15]

3. knowledge of advantages and disadvantages of major process equipment. - [k_w12, k_w15]
4. knowledge of methods for calculating the selected process equipment. - [k_w12, k_w15]
2. the student knows the limits of his own knowledge and understands the need for continuing education. - [k_k01]

Skills:
1. the ability to read and create technological schemes of industrial installations - [k_u01]
2. the ability to perform basic calculations of process equipment - [k_u07]
3. the ability to select the basic process equipment - [k_u15]

Social competences:
1. the student has the awareness and understanding of aspects of the practical application of

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 lecture is verified by the colloquium in the form of a multiple-choice test carried out on the penultimate lecture. The test consists of 20-25 questions (closed) and the threshold is 50% of the points. The test issues are delivered to students at the beginning of each subsequent lecture (for the subject of the previous one). The test takes place in a stationary or remote mode. In the case of the remote mode, students take the test using the eKursy platform.
The knowledge acquired as part of the exercises is verified in the form of two colloquia taking place at the beginning and end of the semester. Both colloquia consist of solving tasks. The first colloquium consists of 5 short tasks related to basic calculations and transformations in chemical engineering. The second colloquium consists of 2-3 tasks, differently scored, related to the subject of the exercises. The credit threshold is 50%. First colloquium takes place at the second classes. Second colloquium takes place at the penultimate classes and the correctional colloquium on the last. The test takes place in a stationary or remote mode. In the case of the remote mode, students solve tasks in a specially prepared activity in the eKursy. During the remote test, the student"s camera must be turned on. Solutions are entered manually or by adding scans of the solution sheet.

Programme content

Issues related to the knowledge of equipment used in unit operations carried out in the chemical and related industries.

Course topics

During the course are discussed:
- Types and principles of the creation of the flowsheets, P&ID software, principles of pipelines design, pipeline classes according to ISO and ANSI standards, types of storage vessels, design of stirred vessels, static mixers, pneumatic mixers and jet mixers, solid-gas separators, solid-liquid separators, evaporators and heat exchangers;
Within the exercise are discussed:
- discharge time from the apparatus, Bernoulli"s equation, calculations of pressure drop, the selection and calculation of the pumps, the creation of technological schemes

Teaching methods

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

Bibliography

Basic
1. J. Warych, Aparatura chemiczna i procesowa, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2004
2. H. Błasiński, B. Młodziński, Aparatura przemysłu chemicznego , WNT, Warszawa, 1983
3. J. R. Couper, W. R. Penney, J. R. Fair, S. Walas, Chemical Process Equipment - Selection and Design, Elsevier 2010.

4. PN-EN ISO 10628-2:2013-06E Schematy dla przemysłu chemicznego i petrochemicznego -- Część 2: Symbole graficzne
5. PN-EN ISO 10628:2005P Schematy technologiczne instalacji przemysłowych. Zasady ogólne
6. N.A. Kazulin, W.N. Sokołow, A.J. Szapiro, Maszyny przemysłu chemicznego. Przykłady i zadania, WNT, Warszawa, 1970.
Additional
1. Aparatura chemiczna, Pikoń J., Państwowe Wydawnictwa Naukowe, Warszawa, 1983

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00