COURSE DESCRIPTION CARD - SYLLABUS

Course name

Aparatura przemysłu chemicznego (Apparatus of chemical industry)

Course

Field of study
Technologia chemiczna (Chemical Technology)

Year/Semester
2/4

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
20

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars
15

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
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Wydział Technologii Chemicznej

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Responsible for the course/lecturer:

Prerequisites

basics math, physics and chemistry; principles of engineering drawing; ability to use CAD software; ability to use calculation software; familiarity with the moodle.put.poznan.pl service; ability to create engineering design documentation; 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 apparatus 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 based on the Polish Technical Authority (UDT) requirements.

Course-related learning outcomes

Knowledge

1. Knowledge of the basic types of apparatus in chemical industry. - [K_W12, K_W14]

2. Knowledge of graphic symbols of equipment and machinery used in the creation of technological schemes in accordance with PN EN ISO 10628. - [K_W04]

3. Knowledge of methods for calculating the selected process equipment. - [K_W12, K_W14]

Skills

1. The ability to read and create technological schemes of industrial installations - [K_U03]

2. The ability to design of stirred vessel with two-phase system - [K_U01, K_U02, K_U07, K_U15, K_U27]

3. The ability to solve calculation problems during designing of chemical equipment - [K_U07]

4. Can communicate knowledge in the form of oral presentation [K_U04]

Social competences

1. The student has the awareness and understanding of aspects of the practical application of knowledge. - [K_K02]

2. The student knows the limits of his own knowledge and understands the need for continuing education. - [K_K01]

3. The student is aware of the advantages and limitations of individual work – [K_K03]

4. The graduate can work in the group and knows limitation of such cooperation – [K_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired as the lecture is verified by the exam in the form of a multiple-choice test carried out on the penultimate lecture. The exam consists of 20-25 questions (closed) and the threshold is 50% of the points. The exam issues are delivered to students at the beginning of each subsequent lecture (for the subject of the previous one).

The skills acquired in the project classes are verified in the form of a defense taking place in the last and penultimate classes. The final assessment is the sum of the sub-points for documentation (40points) and project defense (60points). The credit threshold is 50 pts.

Programme content

During the course are discussed:

- construction of stirred vessels, static mixers, solid-liquid separators, solid-gas separators, evaporators, heat exchangers, distillation equipment, distillation column, absorbers, adsorbers, extraction equipment, crystallizers, dryers and chemical reactors

- principles of pipelines design, pipeline classes, types of valves;

- principles of design of stirred vessel; calculation of physicochemical properties, minimal impeller speed; mixing power; calculation of engine power; calculation of shaft diameter; calculation the strength of the shaft; calculation of vessel support; selection of clutch and moto-reducers; application of inverters; calculation of drop diameter and interfacial area; discharge time

Teaching methods

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

Bibliography

Basic

1. Aparatura chemiczna i procesowa, Warych J., Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2004

2. Aparatura przemysłu chemicznego, Błasiński H., Młodziński B, WNT, Warszawa, 1983

3. Chemical Process Equipment - Selection and Design, Couper J. R., Penney W. R., Fair, J. R., Walas, S. M., Elsevier 2010.

4. Podstawy konstrukcji aparatury chemicznej, Pikoń J., Wydawnictwa Politechniki Śląskiej, Gliwice, 1973

5. PN-EN ISO 10628 Schematy technologiczne instalacji przemysłowych. Zasady ogólne

6. Pomoce projektowe z podstaw maszynoznawstwa chemicznego, Wilczewski T., Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2008.

Additional

1. Aparatura chemiczna, Pikoń J., Państwowe Wydawnictwa Naukowe, Warszawa, 1983

2. Mieszanie i mieszalniki, Stręk F., WNT, Warszawa, 1981

3. Mieszanie układów wielofazowych, Kamiński J., WNT Warszawa 2004

4. Sedymentacja zawiesin, zasady i projektowanie, Bandrowski J., Merta H., Zioło J. Wydawnictwo Politechniki Śląskiej

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	40	1,5
Student's own work (literature studies, preparation fo classes, preparation for defence/exam, project preparation) [1]	60	2,5

[1] delete or add other activities as appropriate