COURSE DESCRIPTION CARD - SYLLABUS

Course name
Pharmaceutical industry equipment [S1IFar2>APC]

Course

Field of study
Pharmaceutical Engineering

Year/Semester
2/4

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
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Basics of mathematical calculations, physics, biology and chemistry; rules for creating design documentation; basics of pharmaceutical and chemical materials science and machinery; ability to use spreadsheet software; ability to use CAD software; The student is aware of the advantages and limitations of individual and group work when solving problems of an industrial and design nature; student knows the limitations of their knowledge and sees the need to deepen it.

Course objective

Knowledge of equipment used in the pharmaceutical industry and related industries . The student acquires literacy and the creation of simple technological schemes of the pharmaceutical industry, as well as the basic calculations of selected process equipment of the pharmaceutical industry

Course-related learning outcomes

Knowledge:
1. Student has basic knowledge of the construction of equipment and installations in the pharmaceutical and related industries. [K_W18]
2. Student knows the rules for the selection of equippment used in the pharmaceutical, cosmetic and

chemical industries. [K_W16]

Skills:
1. Student can choose the right equipment to solve simple and complex engineering tasks related to pharmaceutical engineering, it can analyse and assess the functioning of the basic equipment of the pharmaceutical industry. [K_U16]
2.Student knows how to read technological diagrams. [K_U18]

Social competences:
1. Student is ready to critically assess his knowledge, understands the need to learn, complement directional knowledge and improve his professional, personal and social competences, understand the importance of knowledge in problem solving and is ready to consult experts. [K_K1]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired as part of the lecture is verified by an exam in the form of a multiple-choice test. The exam takes place in an exam session and consists of 20-25 questions (test and closed), Passing threshold: 50% points. The exam takes place in stationary or remote mode. In the station mode, the exam can take place in a lecture hall or computer room (depending on the availability of the latter). In the case of the exam in the computer room, students solve the test using computers and the eKursy platform. The exam in remote mode is possible only after the appropriate decision of the Rector of the PP. Regardless of the mode, the rules of the exam are the same.

Programme content

The lectures discuss the following operations: preparation of substrates, product separation and preparation, mass and heat exchange, chemical reactions and product formation.
Substrate preparation: impact mills, ball mills, jet mills, rotors, breakers and crushers, mechanical and static mixers
Product separation and preparation: deranged spacing machines, filters, filter presses, filter centrifuges, sedimentation centrifuges, distillation, distillers and distillation columns, rectification, rectification columns, extraction and extraction columns, evaporators and concentration of solutions, crystallizers, dryers and drying, freeze dryers.
Heat transfer: heat exchangers, shell, spiral, tubular, condensers and cooling apparatus
Mass exchange: mass exchangers, packed columns, tray columns, adsorption columns and adsorption
Chemical reactions: chemical reactors
Product molding: granulation and granulators, tablet presses and tableting, capsules

Course topics

none

Teaching methods

multimedia presentation, illustrated with examples and films in stationary or remote mode

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. Lewicki P. (pr.zbiorowa), Inżynieria procesowa i aparatura przemysłu spożywczego, WNT, Warszawa 2006.

Additional:
1. Rozporządzenie Ministra Zdrowia z dnia 9 listopada 2015 roku w sprawie wymagań Dobrej Praktyki Wytwarzania

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	37	1,50