



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Pharmaceutical Industry Equipment

		Course
Field of study		Year/Semester
Pharmaceutical Engineering		2/4
Area of study (specialization)		Profile of study
-		general academic
Level of study		Course offered in
First-cycle studies		polish
Form of study		Requirements
full-time		compulsory

		Number of hours
Lecture	Laboratory classes	Other (e.g. online)
30	0	0
Tutorials	Projects/seminars	
0	0	
Number of credit points		
2		

		Lecturers
Responsible for the course/lecturer:		Responsible for the course/lecturer:
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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 equipment 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 and perform technical drawings and technological diagrams, he can use the selected computer program to create them [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 the multiple choice test. The exam consists of 20-25 questions (test and closed), pass threshold: 50% of points. The exam could be performed in stationary or remote mode. Regardless of the mode 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



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	50	2,0
Classes requiring direct contact with the teacher	30	1,2
Student's own work (literature studies, preparation for exam) ¹	20	0,8

¹ delete or add other activities as appropriate