



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Pharmaceutical industry equipment- design of stirred vessel [S1IFar2>APCpm]

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 elective

Number of hours

Lecture 0	Laboratory classes 0	Other 0
Tutorials 0	Projects/seminars 15	

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Basics of mathematical calculations, biology, physics and chemistry; rules for creating design documentation; basics of pharmaceutical material science and machinery; technical drawing rules; ability to use CAD software; ability to use spreadsheet software; ability to create electronic documentation; ability to obtain information from standards and catalogues of structural elements; The student is aware of the advantages and limitations of individual and group work when solving problems of an industrial and design nature; The student knows the limitations of her knowledge and sees the need to deepen it.

Course objective

Obtaining knowledge in the design of the stirred vessel for the preparation of the selected two-phase system (liquid-liquid, gas-liquid, solid liquid)

Course-related learning outcomes

Knowledge:

1. Student has basic knowledge of stirred vessels calculations in the pharmaceutical industry and related industries [K_W18]
2. Student has knowledge of stirred vessel construction in the pharmaceutical industry [K_W18]

Skills:

1. Student can design a stirred vessel for the pharmaceutical industry [K_U17]
2. Student takes into account and applies the standards applicable in the industrial environment [K_U21]
3. Student can plan and organize individual work and team work and work both individually and as a team [K_U25]

Social competences:

1. Student is ready to make a decision on its own, to critically assess its own actions, to take responsibility for the effects of these actions [K_K2]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The skills acquired in the project classes are verified in the form of a defense taking place in the last and penultimate classes in stationary mode or remote mode. The final assessment is the sum of the sub-points for documentation (40points) and leave the oral questions (60points). The payment threshold is 50 pts

Programme content

The program covers the following topics:

1. Principles of stirred vessel.
2. Basics of stirred vessel construction.
3. Optimization of stirred vessel operating parameters.
4. Preparation of technical documentation, technological cards.
5. Requirements for equipment in the pharmaceutical industry.

Course topics

The classes discuss:

the design principles of the stirred vessel; design schedule; physico-chemical parameters of multiphase systems, minimum impeller speed; mixing power; the necessary engine power; shaft diameter calculations; strength of the shaft; calculation of supports; selection of clutch and geared motorist; the use of inverters; the diameter of the drops and the interfacial area; the time of discharge from the vessel; preparation of technical documentation, technology cards (datasheet); requirements of the pharmaceutical industry; cleanness of equipment

Teaching methods

Multimedia presentation, presentation illustrated with examples on the board, and resolving tasks provided by the presenter; eKursy

Bibliography

Basic:

1. F. Stręk, Mieszanie i mieszalniki, WNT, Warszawa 1982.
2. J. Kamiński, Mieszanie układów wielofazowych, WNT, Warszawa 2004.
3. J. Pikoń, Podstawy konstrukcji aparatury chemicznej, Wydawnictwo Politechniki Śląskiej, Gliwice 1973.
4. T. Wilczewski, Pomoce projektowe z podstaw maszynoznawstwa chemicznego, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2008.
5. Rozporządzenie Ministra Zdrowia z dnia 9 listopada 2015 roku w sprawie wymagań Dobrej Praktyki Wytwarzania

Additional:

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Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	0,50