COURSE DESCRIPTION CARD - SYLLABUS

Course name
Material science and theory of machines [S1IFar2>MiM]

Course

Field of study
Pharmaceutical 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
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Waldemar Szaferski
waldemar.szaferski@put.poznan.pl

Lecturers

Prerequisites

Knowledge in the field of mathematics, physics and the basics of technical drawing and engineering graphics. Ability to read and understand technical drawings. Readiness to make decisions and cooperate within a specified team and be aware of the need of lifelong learning.

Course objective

Obtaining knowledge about the strength properties of construction materials used in the construction of process equipment used in the pharmaceutical industry. Getting to know the elements of machines found in the constructions of these apparatus and industrial devices. Acquiring engineering skills in the selection of materials that meet the criteria of high purity of the product in the pharmaceutical and related industries.

Course-related learning outcomes

Knowledge:
1. The student knows the basic concepts in the field of strength of materials used in the pharmaceutical industry [K_W13]
2. The student knows the basic concepts associated with the forces occurring in the construction of machines and equipment [K_W5, K_W15]

3. The student knows the basic elements of machines found in the process facility [K_W13]
4. The student knows the selection criteria of materials for the components of process equipment in the pharmaceutical industry [K_W14]
5. The student knows the effects of the equipment's working conditions on their strength in the assumed working time [K_W5]

Skills:
1. The student can use the basic physical and chemical laws in the construction of industrial equipment of the pharmaceutical industry [K_U1, K_U5]
2. The student can describe and select machine elements and their joints [K_U1]
3. The student can choose the right type of construction material for the designed process equipment of the pharmaceutical industry apparatus [K_U20]
4. The student is able to assess the influence of the type of selected material on the working time of equipment in terms of corrosivity [K_U14]

Social competences:
1. The student is aware of the limitations of their own knowledge, and therefore the need for education and development [K_K1]
2. The student knows the pros and cons of teamwork and adheres to the principles accompanying such a way of solving problems in industry [K_K4]
3. The student can think and act in a creative and entrepreneurial way [K_K5]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired as a part of a lecture is verified at the final test after the fifteenth lecture. The test consists of 40-50 test questions (constant scoring for all questions) or 5-10 open questions (different scoring). Passing threshold: 51% of points. Issues for the final test, on the basis of which questions are developed, will be sent to students by e-mail using the university e-mail system.
If the classes will be held remotely, the forms of course assessments will remain unchanged and will be carried out with the use of tools provided by the Poznań University of Technology (https://elearning.put.poznan.pl/), about which students will be informed as soon as possible possible.

Programme content

As part of the course, basic knowledge of materials used in the construction of process apparatus as: alloy steels, acid-resistant and heat-resistant steels, non-ferrous metals and their alloys, structural plastics and natural materials will be presented. Fundamentals of strength of materials and elements of machines and their connections. Discussion of the most important types of normal stress, tangential and equivalent stresses.

Course topics

none

Teaching methods

Multimedia presentation illustrated with examples on the board, and supportive materials to classes sent to students by e-mail using the university e-mail system.

Bibliography

Basic:
1. Potrykus J., Poradnik mechanika, REA, Warszawa 2008
2. Wilczewski T., Pomoce projektowe z podstaw maszynoznawstwa chemicznego, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2008
3. Lewandowski W.M., Ryms M., Maszynoznawstwo chemiczne podstawy wytrzymałości i przykłady obliczeń, PWN, Warszawa 2017
4. Pikoń J.: Podstawy konstrukcji aparatury chemicznej, cz. I i II, PWN, Warszawa 1979
5. Biernat J., Materiałoznawstwo. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2016

Additional:
1. Bańkowski Z., Mały poradnik mechanika. T. 1, Nauki matematyczno-fizyczne, materiałoznawstwo. Wydawnictwa Naukowo-Techniczne, Warszawa 1996
2. Bańkowski Z., Mały poradnik mechanika. T. 2, Podstawy konstrukcji maszyn, maszynoznawstwo. Wydawnictwa Naukowo-Techniczne, Warszawa 1994
3. Niezgodziński T., Wytrzymałość materiałów. Wydawnictwo Naukowe PWN, Warszawa 2010
4. Niezgodziński M.E., Niezgodziński T., Wytrzymałość materiałów. Wydawnictwo Naukowe PWN, Warszawa 2010
5. Bielewicz E., Wytrzymałość materiałów. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2013

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00