



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials science and basics of machine construction - tank design with a supporting structure
[S1TOZ1>MiPKMpzzkn]

Course

Field of study

Circular System Technologies

Year/Semester

1/2

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

dr inż. Waldemar Szaferksi

waldemar.szaferksi@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

The goal of the course is to acquire the knowledge about strength properties of construction materials used in the assembly of process apparatus. Acquiring engineering skills for independent design of a vertical tank used for storing liquid mixtures in industrial technological installations and design and selection of the supporting structure.

Course-related learning outcomes

Knowledge:

1. the student knows the basic elements of machines included in the installation of chemical and related industry equipment [k_w4, k_w13].
2. the student knows the criteria for the selection of construction materials for elements of the

chemical industry apparatus [k_w4, k_w13].

3. the student knows the effects of the apparatus operating conditions on their strength in the assumed working time [k_w14, k_w15].

4. the student knows the design process of the pressure vessel and other basic devices [k_w14, k_w15].

Skills:

1. the student can choose the right type of construction material in the design process of the apparatus used in the industry [k_u1, k_u2].

2. the student can properly choose a computer program to accelerate the design process [k_u5, k_u7].

3. the student can design basic devices (storage and pressure tanks) and equip with fittings [k_u15, k_u27].

Social competences:

1. the student is aware of the limitations of their own knowledge, and therefore the need for education and development [k_k1, k_k3].

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_k1, k_k3].

3. the student can think and act in a creative and entrepreneurial way [k_k1, k_k6].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

Skills acquired as part of the project classes are verified on the basis of the individual project carried out and oral assessment of the submitted project, consisting of 3-5 open-ended questions related to the project. Passing threshold: 51% of points from oral answer and correctness of the prepared project.

Programme content

As part of the classes, practical strength calculations of apparatus components.

Course topics

As part of the classes, practical strength calculations of apparatus components such as supports and supporting structures affecting the safety of apparatus operation in the pharmaceutical industry will be presented. Design principles of vertical tank for storing liquid mixtures as the basic process laboratory apparatus and industrial installations of the chemical and related industries. The apparatus must be equipped with a support structure that maintains the vertical character of the apparatus and stabilizes its operation.

Teaching methods

Multimedia presentation illustrated with examples given on the board, and completing tasks given by the teacher - practical exercises.

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.

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. Lewandowski W., Melcer A., Zadania z maszynoznawstwa chemicznego. Wydawnictwo Politechniki

Gdańskiej, Gdańsk 2011.

4. Bielewicz E., Wytrzymałość materiałów. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2013.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	16	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	9	0,50