GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	THEORY OF MACHINES AND APPARATUS, PG_00048406						
Field of study	Chemistry						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Katarzyna Januszewicz				
	Teachers		dr inż. Katarzyna Januszewicz				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	30.0	0.0	60
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours	Self-study		SUM
	Number of study hours	60		5.0	60.0		125
Subject objectives	Student learning with technical and engineering issues such as technical drawing, strength of materials, construction materials, connections, parts of machines and apparatus from chemical industry. Understanding the principles of operation and construction of equipment used in industry, in particular the chemical industry.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W10	The student recognizes the devices on the technical drawing and is able to describe their construction and principle of operation. The student is able to select a pump in the proposed technological system.	[SW1] Assessment of factual knowledge
[K6_U04] can use professional vocabulary, can prepare and communicate technical information in the form of text documents, spreadsheets, charts and technological schema	The student recognizes five basic strength stresses in the technique (tensile, compressive shear, buckling and pressure). The student classifies, describes and draws the basic connections used in the chemical industry. Calculates the basic dimensions of tank or installation elements. Recognizes the basic types of valves and fittings of the chemical industry. Knows the division of construction materials used in the construction of installations of the chemical industry. The student can choose a pump for the installation. The student can use the technical standards. Student is able to recognize the basic elements of technical installations in the technical drawing.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U06] can analyze the functioning of equipment, apparatus and technology lines used in laboratories and chemical industry, and can recognize and propose methods to solve the simple engineering tasks which he can meet as an Engineer and select and use routine methods, chemical apparatus and tools to solve practical engineering tasks, including also technological processes; can himself/herself read and make technical drawings using CAD software	The student is able to draw in three projections and axonometry and in cross-section the subject. Knows the basics of dimensioning and principles of technical drawing.	[SU1] Assessment of task fulfilment

Subject contents

The program includes, among others: - the basics of technical drawing, the principles of drawing chemical apparatus, valves, tanks, conveyors, etc., the principles of preparing and reading technical drawings, diagrams and technical documentation, - selected issues of mechanics, statics and strength of materials such as: stretching, compression, pressure, shear and tank strength, - connections used in the construction of equipment and apparatus of the chemical industry: such as threads, welds, rivets and others, - review of construction materials found in the chemical industry, such as: metals (ferrous and non-ferrous), materials natural (wood, leather, cork, rubber) and artificial (ceramics, glass, plastics). - discussion of the construction and operating principles of chemical industry plant components, including tanks, valves, liquid level gauges, sight glasses, measuring points, mixers, etc., - presentation of material transport equipment: mechanical, pneumatic, hydraulic conveyors, as well as mixers and mixers, - apparatus for heat exchange (diaphragmless heat exchangers, recuperators and regenerators), - equipment for crushing and screening (crushers, jaw breakers, rolling mills, mills, disintergators), - apparatus and devices for the distribution of heterogeneous mixtures, including gas dedusting and separation of suspensions, - pumps

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	60.0%	20.0%
	60.0%	50.0%
	60.0%	30.0%

Recommended reading	Basic literature	Praca zbiorowa, Mały Poradnik Mechanika t.I i II, WNT, Warszawa, 1988, W.Lewandowski, Maszynoznawstwo chemiczne, Ćwiczenia projektowe, Wyd. PG., 1979, W.Lewandowski, A.Melcer, Zadania z maszynoznawstwa chemicznego, Wyd.PG, 2011. W.Lewandowski, Maszynoznawstwo chemiczne, Ćwiczenia projektowe, Wyd. PG., 1979, W.M.Lewandowski, Notatki z wykładów, W.Lewandowski, Techniczno-technologiczne i aparaturowe aspekty ochrony powietrza, Wyd.PG.Gdańsk, 2011 J.Pikoń, Podstawy konstrukcji aparatury chemicznej , cz.1, PWN, Warszawa, 1979 J.Pikoń, Aparatura chemiczna, PWN, Warszawa, 1978 J.Pikoń,Atlas konstrukcji aparatury chemicznej, PWN, Warszawa, 1987
	Supplementary literature	(http://www.pg.gda.pl/chem/Katedry/Maszyny/masz_index.html)
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Technical writing, projection. 2. Finding the third throw. 3. Axonometric drawing. 4. Tasks from tanks (wall thickness), transport screw diameter, flange connection. 5. Calculating the tasks of practical use of the Bernoulli equation and stream continuity equation. 6. Pump selection and piping system design.	
Work placement	Not applicable	