GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Theory of machines and engineering graphics, PG_00057672		
Field of study	Green Technologies		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	Obligatory subject group 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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department Of Energy Conversion And Storage -> Faculty Of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Michał Ryms	
	Teachers	dr hab. inż. Michał Ryms	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	30.0	0.0	45

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	45	10.0	50.0	105

Subject objectives

Student is able to recreate spatial elements on a drawing plane, using orthogonal and axonometry, as well as cross-section projections. Is familiar with basic dimensioning guidelines and how to prepare technical drawings (working and assembly drawings). Student recognizes the tension strength in technology. Classifies, describes and draws the basic connections used in the chemical industry. Calculates the dimensions of the tank or installation. Recognises the basic types of valves and fittings found in chemical industry.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W01] has a basic knowledge from some branches of mathematics and physics useful for formulating and solving simple problems in the field of environmental technologies and modern analytical methods	Student can use known methods and mathematical models to describe and explain physical phenomena and chemical processes.	[SW3] Assessment of knowledge contained in written work and projects
[K6_W06] has a basic knowledge of chemical engineering, mechanical engineering and chemical equipment, knows and understands basic processes taking place in green, proenvironmental technologies	Student gains the ability to apply technical drawing and graphical presentation of machines elements and mechanical systems.	[SW1] Assessment of factual knowledge
[K6_K04] is ready to think and act in a creative and enterprising way, to negotiate, work in a team, assuming different roles	The student is able to creatively use the acquired knowledge in the field of mechanical engineering.	[SK5] Assessment of ability to solve problems that arise in practice
[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes	The student can use known methods of mathematical models describing strength of materials.	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Program Content:
Over the course of lectures, student familiarizes himself with methods of spatial element recreation in a the drawing plane, theory of engineering design recording and methods of computer-aided systems designing. The scope of program includes, in particular:
- Introduction to the subject (formats, lines, scales, technical writing),
- Methods of imaging three-dimensional objects on a drawing plane (object projections, finding the missing projection and isometric projections, cross-sections, revolved sections with dimensioning guidelines),
- Working and assembly drawings preparation,
- Separable connection drawings (threaded connections, pipe threaded connections, bolts, fittings and elbows, thread protections against dismantling),
- Inseparable connection drawings (welded, soldered and riveted connections),
- Drawings of selected elements from heating and plumbing installation and armature (with emphasis on tanks, piping, valves, sight glasses, liquid level gauges and measuring points). Different examples from chemical industry.
- Full installations projects (drawings).
Drawing fittings elements of chemical, food and pharmaceutical installations with special attention to tanks, piping, valves, sight glasses, liquid level gauges and measuring connectors. Project calculations. Selection from the catalogues the tank fittings and equipments. Design of the tank or other device (calculations, drawings).</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>Midterm colloquiums</td><td>60.0%</td><td>60.0%</td></tr>
<tr><td>Drawings dokumentation</td><td>60.0%</td><td>10.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. M. Kochanowski, Zapis konstrukcji z geometrią wykreślną, Wyd. PG 2002,
2. K. Paprocki, Zasady zapisu konstrukcji, OWPW, Warszawa 2000,
3. M.Ryms, W.M. Lewandowski, Chemical theory of machines, PWN 2017,
4. T. Dobrzański, Rysunek techniczny maszynowy, Wyd. WNT 2013.</td></tr>
<tr><td>Supplementary literature</td><td>websites materials, programs instructions, catalogues and industry standards</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
Maszynoznawstwo i grafika inżynierska - Moodle ID: 43968
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=43968</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Learning about technical drawing (e.g.: prepare orthogonal projections of an item on the basis of its axonometric projection and vice versa, dimension a given element, draw a following item as a half-view-half section).
Drawing fittings of the chemical, food and pharmaceutical industries with emphasis on tanks, pipelines, valves, sight glasses, liquid level gauges and measuring connectors (e.g.: draw a vertical sight glass, what are the possible variants of its construction, what it is used for).
Tank design calculations. Selection of tank fittings. The design subject containing both calculations and drawings.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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