



Subject card

Subject name and code	Machine engineering, PG_00060846						
Field of study	Chemical Technology						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Michał Ryms				
	Teachers						
Lesson types	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		5.0		40.0	90
Subject objectives	To provide students with technical and engineering problems, such as.: technical drawing, strength of materials, construction materials, connection of machines and parts of devices and apparatus in the chemical industry.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U08] Is able to select elements of automatic control systems for simple technological processes and use computer programs to control and optimize chemical processes.		classifies construction materials used in the construction of chemical industry installations and selects them taking into account basic strength calculations used in engineering and the chemical industry.		[SU4] Assessment of ability to use methods and tools		
	[K6_W04] Possesses the technical knowledge necessary to analyze processes and design installations in the chemical industry.		identifies five basic stress in strength of materials in engineering (tensile, compressive, shearing buckling and contact stress). Classifies, describes and draws a fundamental connection used in the chemical industry. Calculates the basic dimensions of the tank or installation elements. Recognize the basic types of valves and fittings of chemical industry.		[SW1] Assessment of factual knowledge		

Subject contents

Course content – lecture

Program Content:

- Selected sections of the strength of the materials for the design of tanks and pipes.
- The connections used in the chemical industry, among which are listed: disjoint (threads, call keyways) and shaft (welded, welded, riveted).
- Materials used in construction of chemical industry, including metals (Ferrous and non-ferrous), natural materials (wood, leather, cork, rubber) and artificial (ceramics, glass, plastics).
- Fittings chemical industry, food and pharmaceutical industries with emphasis on tanks, piping, valves, sight glasses, connector and measurement pipes.
- The calculation, drawing, detailing the constituent elements of structural devices the chemical industry such as the wall of the tank, screw the lids, legs reactors, spindle valves, etc.

Course content – project

Week 1. Problems on tensile loading of bolts and rods, Hookes law, orthographic projection. Description of the drawing portfolio and requirement for students to bring it.

Week 2. Problems on compression and calculation of pressure vessels (wall thickness, pressure, diameter). Finding the third view and axonometric drawing.

Week 3. Problems on shear (bolt heads, pins, rivets) and bearing pressure (washers, gaskets). Drawing cross-sections.

Week 4. Problems on moments of inertia and buckling (reactor legs, valve spindles). Detail drawing and principles of dimensioning.

Week 5. Problems involving combined stresses, based on a midterm-type example. Dimensioning of real components. Assignment of the valve design project.

Week 6. Written calculation test (midterm). Discussion of the assembly drawing.

Week 7. Drawing welded details of a vessel (joining plates, shells with flanges, reactor supports and legs, heating jackets, etc.). Project consultations.

Week 8. Drawing threaded details of a vessel (bolts, flange connections, threaded components). Project consultations.

Week 9. Drawing lift valves and gate valves. Project consultations.

Week 10. Drawing other types of valves. Project consultations.

Week 11. Viewing and drawing vessel fittings (sight glasses, level gauges, supports, etc.). Project consultations.

Week 12. Visit to the technology hall and on-site observation of the discussed components. Project consultations.

Week 13. Drawing test (midterm). Project consultations.

Week 14. Resit test (calculation or drawing). Project consultations. Submission of portfolios and projects.

Week 15. Final project and portfolio assessment. Issuing grades.

Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tests in the semester (Project)	60.0%	40.0%
	Drawing Folder (Project)	60.0%	10.0%
	Passing Test (Lecture)	60.0%	50.0%
Recommended reading	Basic literature	M. Ryms, W.M. Lewandowski, Chemical Theory of Machines, PWN 2017, W.Lewandowski, Maszynoznawstwo chemiczne, Wyd. PG., 1998, Praca zbiorowa, Mały Poradnik Mechanika t.I i II, WNT, Warszawa, 1988, Handout at e-nauczanie web page.	
	Supplementary literature	No requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> - 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, - Disjoint connection drawings (screw joints, pipe threaded connections, bolts, fittings and elbows, thread protections against dismantling), - Drawings of permanent joints (welded, soldered and riveted joints), - 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). - Designing of valves (drawings and calculations). Drawing fittings elements of chemical, installations with special attention to tanks, piping, valves, sight glasses, liquid level gauges and measuring connectors. Selection from the catalogues the tank fittings and equipments. 		
Practical activities within the subject	Not applicable		

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